MODERN MECHANIX AND INVENTIONS

JUNE

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SEE PAGE 40

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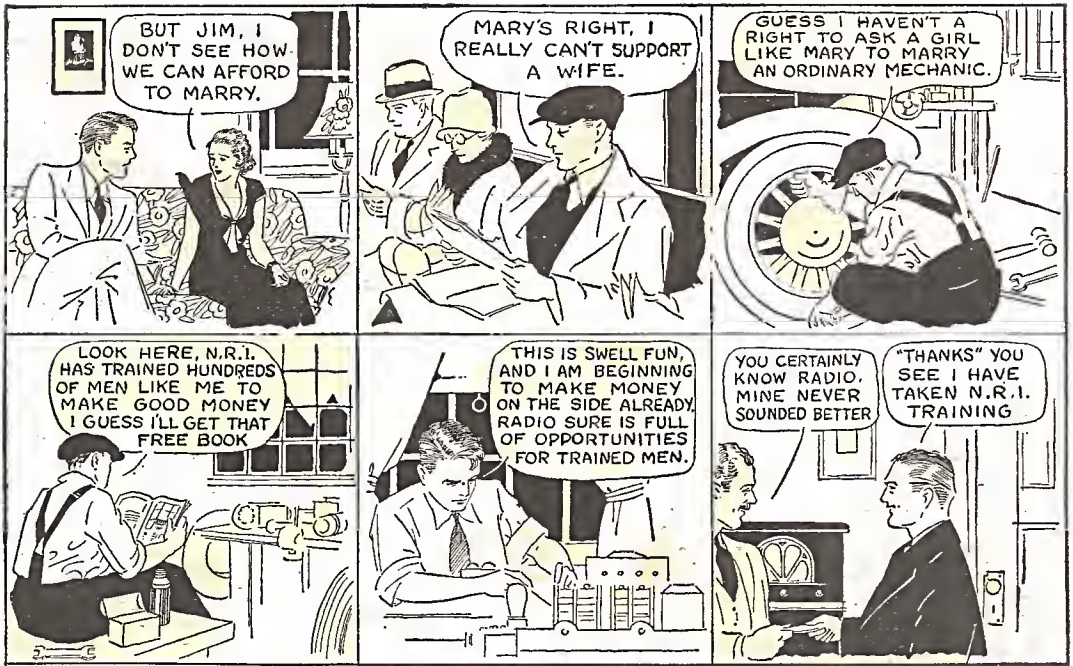
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JUNE, 1933

VOLUME X
NUMBER 2

MODERN MECHANIX AND INVENTIONS

Donald G. Cooley
EDITOR

PRICE 15 CENTS
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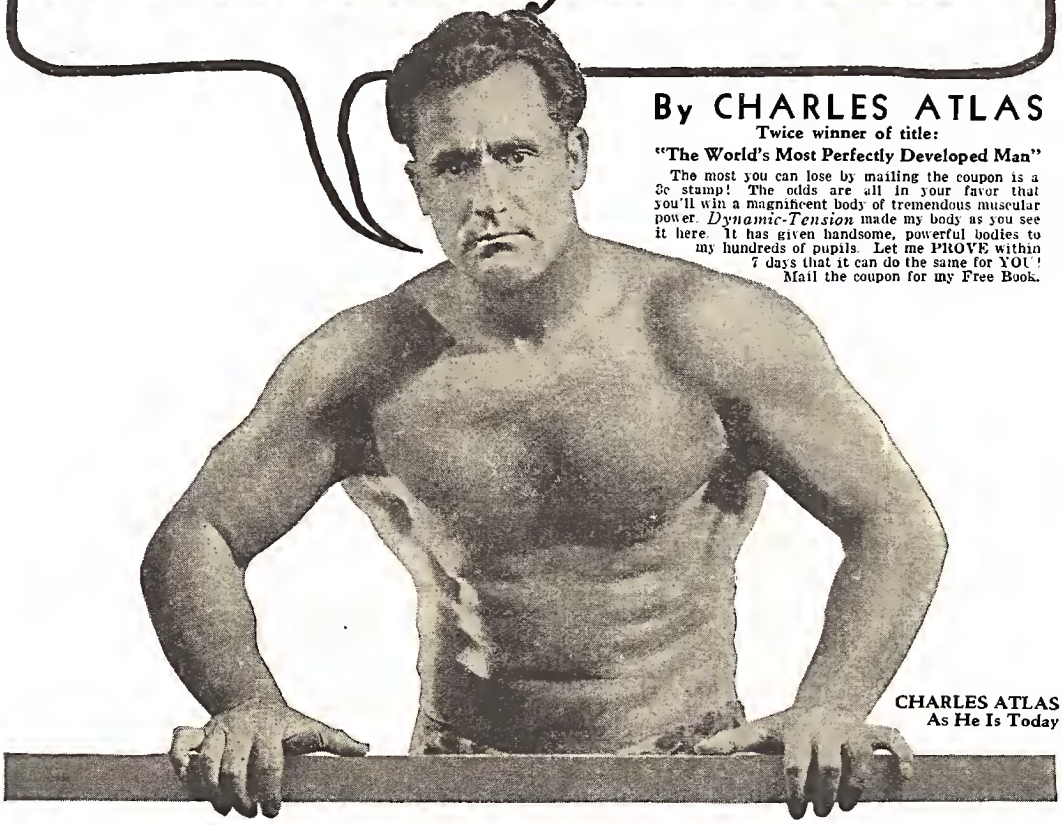

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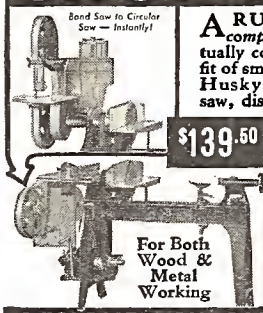

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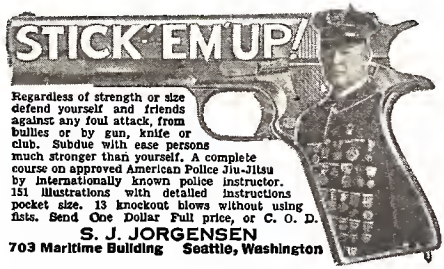

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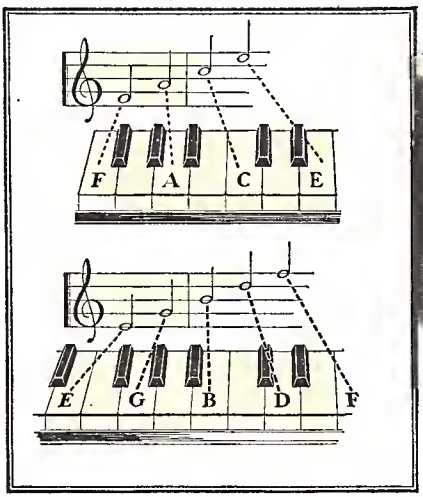

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Have you
.....*Instrument?* .....

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Victor A. Lindahl, of 1406 Leary Way, Seattle, Washington, built this Model T powered baby seaplane. Single float she is, for greatest takeoff efficiency. The motor is inverted. Does she fly? Take a look at the lower right hand corner, which shows a snap of the ship in flight. An Army Lieutenant has described the motor by saying "It's a baby OX5."

Andy's Shop Mail Box

A brighter-than-usual gallery of amateur snapshots sends Andy scurrying for cover while room is made to run the best pics and letters we've had for many a month. Look 'em over.

AVAST there, gents! Make way for the pic of the month. It's right up above here, and is from that west coast seagull Victor Lindahl. Vic has built himself a honey of a baby seaplane around a model T Ford motor, and has adapted the Parasol fuselage into a biplane that flies and flies.

Glimpse the picture, and then strike your eyes to see if it is really true! At last! Here's a baby seaplane, home built, that would do credit to any professional in the plane building business.

Here's Vic's letter:

1406 Leary Way,
Seattle, Wash.

Gentlemen:

Received your letter. Thanks for the congratulations.

Well, my plane is in the air now and everything performs good.

As I had only six and a half hours of training on a land monoplane last spring, I soloed and test flew my seaplane on the same time about six weeks ago. (Of course the "Times" stole that "glory," but I suppose it is all right.)

I had a 20-minute flight and landed safely, but rough, which proves that it flies.

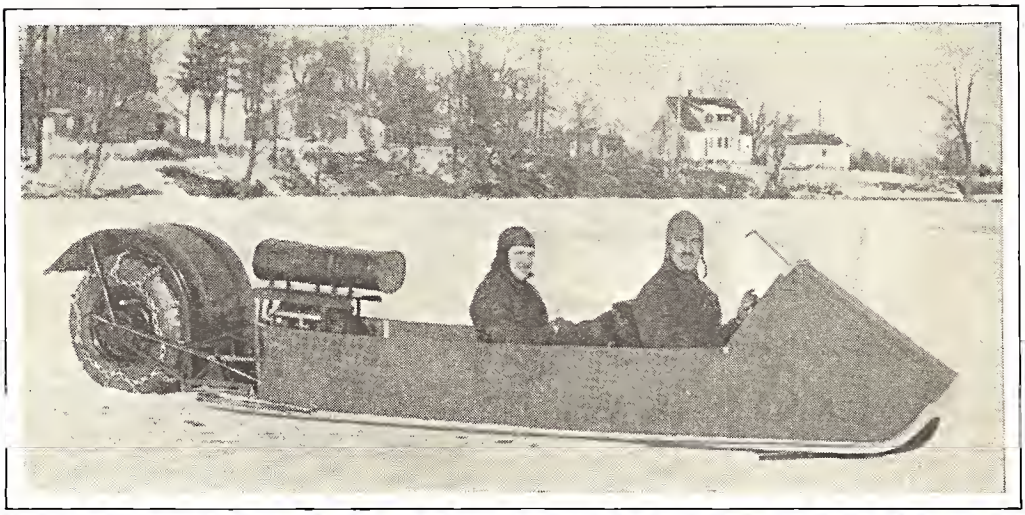
The truth about my plane is that the plane is a converted Heath Super Parasol and is heavy made (approx. 600 pounds empty). If you wish I will give you information about it.

Many of the planes in the Flying Manual are suitable for my inverted models T and A Ford motors.

The inverted Ford T in my plane works fine and is durable, turning a Szekely 40 h.p. propeller 1675 or better. Cannot give you information yet about the Model A, but I assure you it is the most ideal inverted low priced aircraft engine. I will let you know in a few days how it tests out. The drawing of the pontoon I will send you.

Yours truly,
Victor A. Lindahl.

P.S.—Lieut. Adams says that the engine performs and runs as nice as an OX5. If you don't know about the test I gave the engine here it is. Can idle the engine all day without loading up of oil, and wide open 9 hours, 12 min.,



Here's a really practical solution of the ice and snow question. Russell B. North, of Linden, Michigan, built this motorized toboggan. It will actually negotiate snow at a fast clip and ice is pie for it. The motor is a Henderson.

turning a "Club" 17 to 1725 r.p.m. without showing any signs of slowing down. It took me almost 9 months worry to find the right oil system but I got it.

And now you can feast your eyes on the pic, and also just to show you the plane flies I am running the picture of her in the air. Write Vic yourself if you want dope, and don't forget the enclosed stamped self addressed envelope. I wouldn't blame him for not answering if those conditions weren't met. There you are, Vic. Do yer derndest and sell a lot of prints.

* * *

By the Great Horn Spoon! Here is a lad after this doddering old typeslinger's heart. Wish I could invite him to a morning's gab right here at this olde fashioned printerie—we'd lean across a composing desk and let the dappled sunlight flood our thoughts the while we forgot magazines and talked boat, for H. V. Herider has built a Tar Baby, and has done a swell job of it. Hearken ye:

Slater, Mo.

Dear Andy:

Here are some pictures of the first boat we ever built. Perhaps it is recognizable as the Tar Baby. I say perhaps because, as greenhorns will, we took a few liberties with the plans as published.

The hull follows the plans exactly, except that we used butted seams instead of lap-strake construction, and added a decking over the bow to a point a few inches aft of the mast.

Due to the fact that portability was not required in this boat, we made some changes in the rig. The mast is in one piece, and is 14 feet long. The sail is 11 feet on the leach, and 7 feet on the foot—quite a sail for an eight-foot hull. So much sail, in fact, that we named her "Suicide"; and her name is wrong, for a sweeter sailing little boat would be hard to find. A palm leaf fan or earnest conversation is all she needs to make her move, and a 30-mile wind almost makes her "take off." In fact, I think we'll have to weaken and add some reef points for really windy days.

Now we want a bigger boat to put on the Lake of the Ozarks, and that boat will be the "Buddy" unless you publish something better—which will be hard to do.

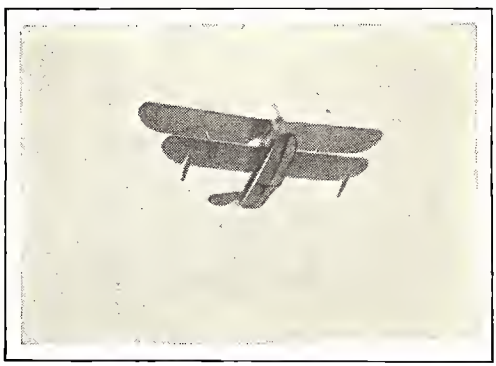
A few flowers for the magazine won't hurt, so permit us to express our appreciation for a good "mag" that publishes workable plans. It's too bad you don't come out twice a month.

Forgive us for our alterations, and accept our thanks and best wishes—and our person-to-person compliments for having wangled the company out of more space for your department.

Sincerely yours,
H. V. Herider.

In case you donna remember, Tar Baby was run in this book, her plans gathered up and reprinted for posterity in Westy Farmer's popular "How to Build 20 BOATS." Youse guys from Missouri can get this by sending in your fifty centimes, and there you'll see "Suicide's" prototype as designed by Walt Stewart. A nice job, Herider, and we all bless your news sense in sending us the shots.

(Continued on page 14)



The Lindahl Seaplane in flight. Vic says the re-souped Ford, inverted Lindahl version, has run 9 hours at a stretch, wide open.

PATENTS

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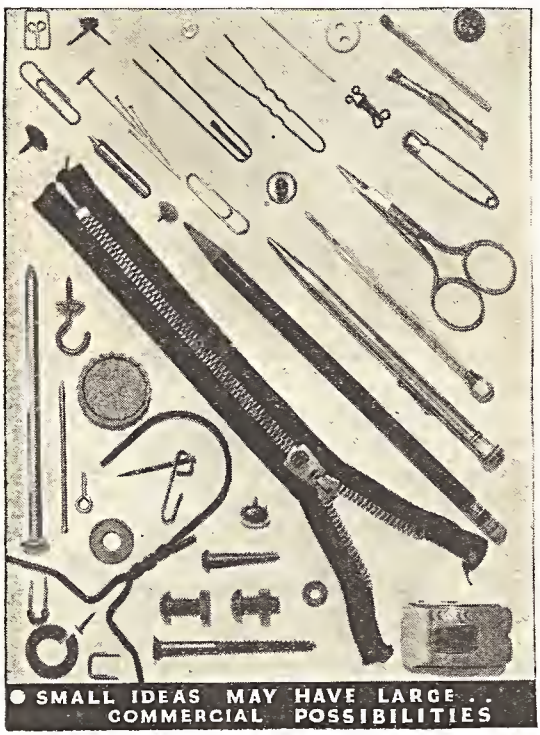

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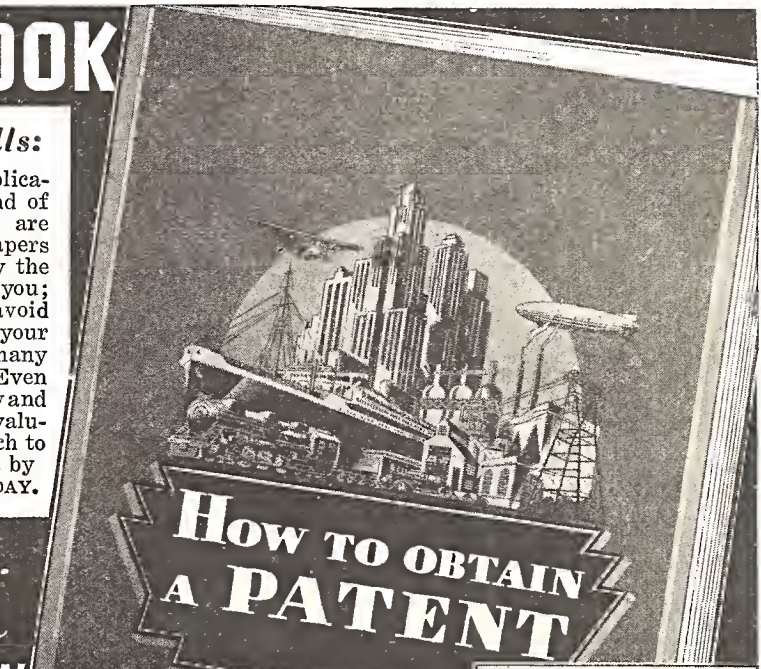

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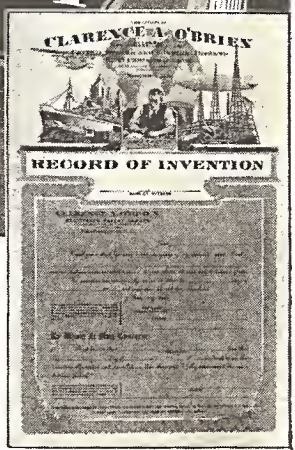

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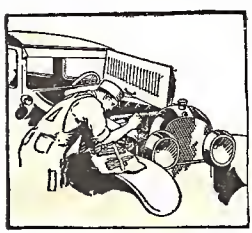

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ANDY'S SHOP MAIL BOX

(Continued from page 11)

H. V. Herider, of Slater, Mo., built this Tar Baby from designs published in MM by Walter E. Stewart. He likes her pu-lenty!

One of the nice things about the Shop Mail Box, and one of the things which makes it one of the most widely read magazine columns is, (1) it is the only really mechanical one done in hangar lingo by a guy who has been through the mill (catch my bow) and (2) we can slip in stuff that has an undefinable but gripping interest, which, if published anywhere else, would be another one of those "so what?" things. Here's an example of such an item:

Story, Wyoming.

Modern Mechanix Publishing Co.,
Minneapolis, Minn.
Dear Sir:

I wrote you some time ago about a car that I was building. I am no good at drawing plans, so will try to describe it as clearly as I can, and also enclose some snapshots of it, as it looks now.

I will give you a description of the frame first and so on.

It has 155 inches of wheel base, a part of two model T Ford frames. The back frame is sawed off, and put over the back of the front frame, riveted and welded together on the bottom. I have a 2x4 clamped to it to help support the frame.

A Ford universal joint between the two motors. Take off fan belt pulley on back motor and file crankshaft square so that universal will fit over it. A patented engine hanger will fit on too bolt in the front of the back motor for its support. There is an iron across the frame there for this engine hanger to rest upon.

The spark control is a rod directly over the left side of the frame, as you will notice in the picture, advances both motors at the same time. The carburetors are both operated from one control. The steering rod is a part of two Ford rods welded together. The pipes for the water system are from an old steam engine flue, water is drawn from the back motor to the radiator by a pump. All bands are taken out of the front motor, and reverse band in back motor, which leaves just clutch and brake.

Motors are timed so that no two compressions are in the same place. This is done by having the pistons in the front motor, 2 at dead center on top and the other 2 are, of course, clear down. In the back motor the crankshaft is horizontal, or I mean that the

(Continued on page 16)

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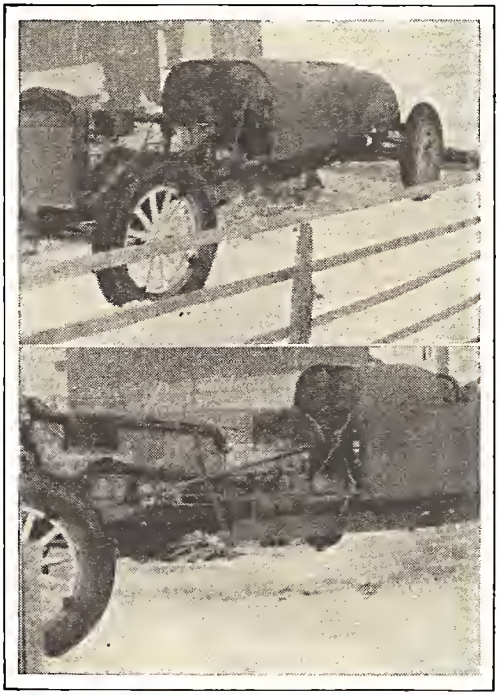


Believe it or not, but this a Model T Ford Straight Eight. Built by Tom Dowling, of Story, Wyo., she has two T engines hooked tandem and about 97 different gear speeds.

pistons are all just half way down in the block.

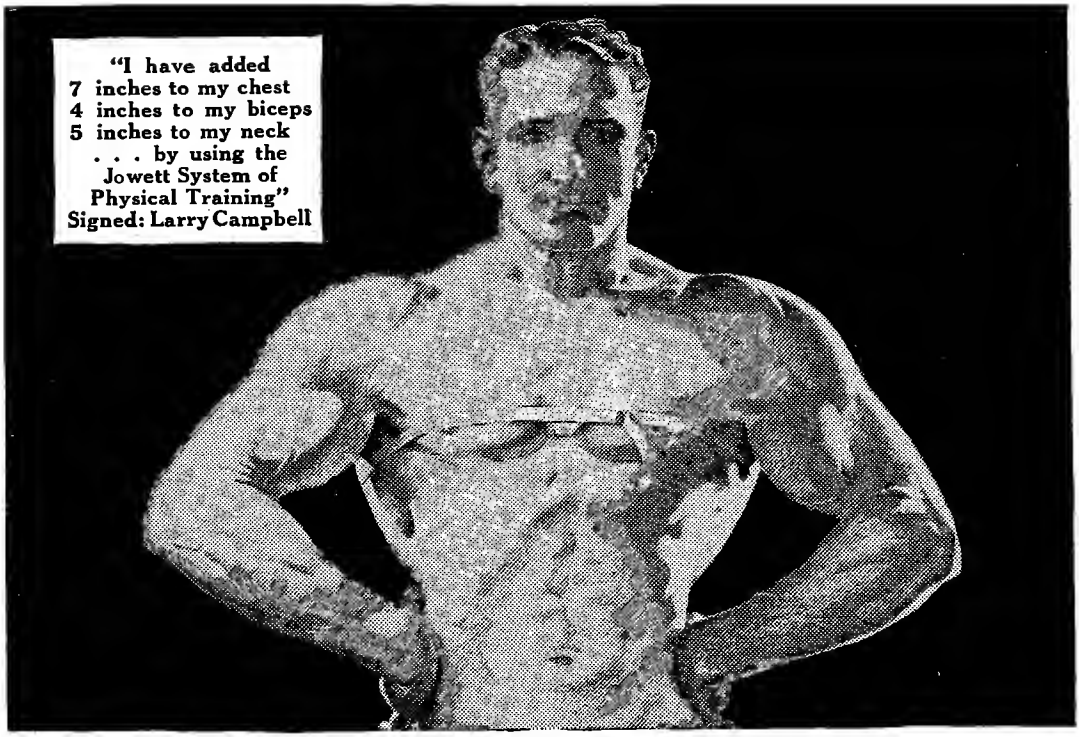
I have a 1926 Chevrolet transmission in it. It is reversed; that makes high gear in the transmission low gear in this. It also makes the other 2 gears overdrives. This gives the car a speed between 130 to 150 miles per hour. The only gear below a direct drive is the Ford low; it has 6 speeds ahead and 2 in reverse. I have 31x5x25 tires on it—this also increases the speed about 10 miles per hour. It will make 60 m.p.h. in low gear in the transmission, and about 90 in second. High gear has been mentioned before.

I get about 17 miles on a gallon of gas. That is because the car is geared up almost twice as fast as one engine could be. I did all my own work but the welding and this is what the car cost me: I gave $2.50 for an old Ford. The other motor was given to me. Gaskets and coil points, $1.80; paint, 60 cents; welding, $1.00. Total, $5.90. It is made from all old Ford parts except the transmission. If you are interetsed and there is anything not clear to you I will try to explain it more clearly next time.

Thomas E. Dowling.

There you are, Gang. Add this to your list of Depression Miracles. A Straight Eight for $5.90. At that it is worth more than one Straight Eight I wrapped around a lamp post on the airfield pike last winter. Say, now, where were we—

(Continued on page 24)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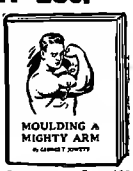

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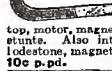

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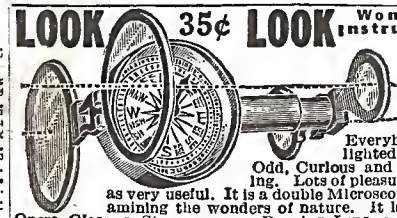

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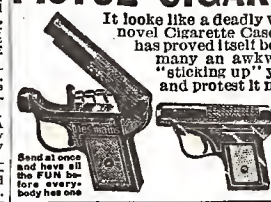

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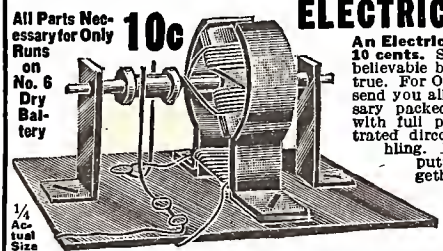

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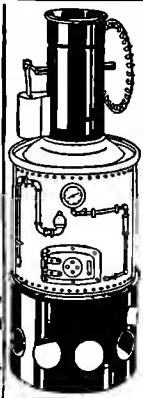

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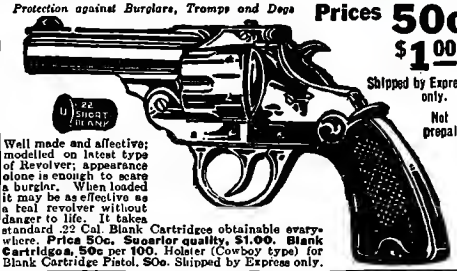

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(Continued on page 22)

CLASSIFIED ADS (Continued from page 21)

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BLUEPRINTS *New PLANS for the Shop Worker*

Get your copy of Modern Mechanix and Inventions' big Blueprint Book—it's free! Projects shown in the book are the most popular how-to-builds run by the magazine, and on every one of them large size, genuine blueprints are available at low cost, making it easy to build the items in your own shop. Boats, airplanes, trailers, home built autos—take your choice from these and scores of other subjects! Thousands of Modern Mechanix and Inventions projects have been built from these blueprints; they're the cream of all how-to-build articles published during the past five years. A few of the plans are listed below:

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SCRAM—Newest addition to the boat plan list. She is 15½ feet of dynamite, inboard motored—will do around 40 with Ford A engine. Forward and aft cockpits, with motor between. Can be built in a garage, and is a flashy performer. Prints include drawings for marine conversion of Model A Ford motor. Blueprints $3.00

AUTOS

BUNGALOW TRAILER — The most popular trailer design ever published; thousands have been built. Two wheeled, folding design—folds together compactly for traveling, can be opened up in camp. Weatherproof; built-in beds for four adults; running water, household comforts. About $30 should build her—much less, if you have a few parts lying around. Wheels and axle from most any discarded car chassis will do. Blueprints $1.00

M-M SPORT ROADSTER—Custom-built to your own fancy! Four-cylinder motorcycle engine, chain drive, wood frame, Model T Ford differential unit, four wheel brakes. With these cheaply acquired units, the car does 65 m.p.h. Body of fabric construction, easy to work. Blueprints $2.50

M-M SPEEDSTER BODY—Racing body for a Model T Ford or similar chassis. Wooden frame, wire covered, then a layer of cotton batting held down by imitation leather. Blueprints $1.00

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AIR CAMPER—Pietenpol's masterpiece, the most popular light plane for amateur construction ever designed. Two place, model A Ford motor, high-wing monoplane. Costs $500 to build, including motor. Thoroughly tested out in cross-country service. Prints give conversion details for Model A motor. Blueprints.....$7.50

SKY SCOUT—A smaller Air Camper, single place, using Model T Ford engine. Designed for easy building, safety rather than speed. Wood fuselage. Blueprints..$4.00

GERE SPORT BIPLANE—The leading light biplane design. Suitable for Model A Ford motor. Single place, rarely beautiful in appearance; an Army pursuit plane in miniature. Steel fuselage. Blueprints $5.00

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WHIZZER—An air-drive speedster, one step scow type hydroplane, driven by air propeller at rear with motorcycle engine. Motor should be of at least 20 h.p., not over 125 pounds weight. Blueprints $1.00

DOROTHY—A John Hanna design, auxiliary cruiser with 10 h.p. motor, two sail plans. Two berths, five-foot headroom in her 24-foot hull. A deep water boat by a master designer. Blueprints...$2.50

GANNET—24-foot cruiser with bunks for two, complete galley, nicely boxed-in Ford engine installation. A very popular design by Charles Hall. Total cost, including motor, from $300 to $500, depending on locality. Blueprints $2.00

CANVAS CANOE—By Chester Nedwidek. Length, 16 ft., planking of 5/32 in. cedar covered with No. 8 canvas. $15 should turn out the complete job. Blueprints $1.00

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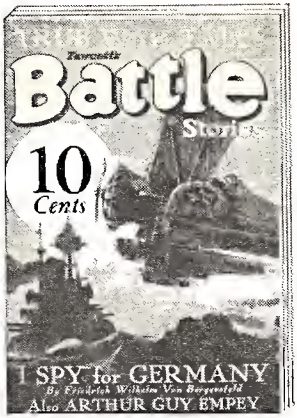

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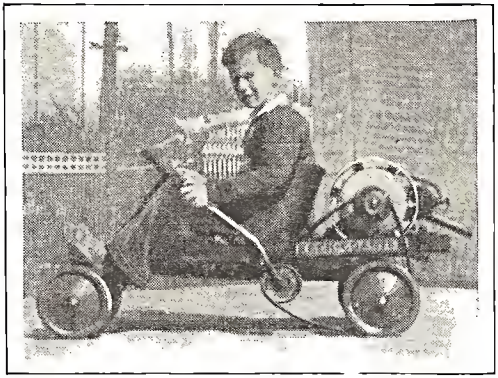
ANDY'S SHOP MAIL BOX

(Continued from page 16)



Sweet and low: a little pup of a car built by Billy Nasmuth, 8 years old, of Sumner, Wash. Hello, Dad. How do I look in print?

And about that little ottomobubble. Glimpse yon pix of the Keen Coaster and Its Belt That Runs The World. The letter:

* * *

Modern Mechanix Publishing Co.
Gentlemen:

Herewith find photo of my washing machine motor runabout. I am 8 years old and enjoy riding. A fan belt connects rear wheel to the motor and is geared to run about six miles per hour but this is fast enough when pulling a wagon load of kids.

Billy Nasmuth,
713 Ryan Street,
Sumner, Wash.

Cost of Machine complete about $23.

* * *

I don't know why I stick pretty much to shop stuff an' sech in this month's colyum. I might as well talk about pheasant breeding or how I'm raising Parachute, the wandering pig, but I guess it's maybe because I've been itching to get my hands on some tools and build me something again.

Have been thinking about an arc welder, lately. This is a very useful new art. Nobody seems to know a whole lot about it, and then I get me a letter from an hombre who has at least started out and done something. Attend:

Box 132
Hollins, Alabama.

Modern Mechanix's Andy
Minneapolis, Minn.
Dear Sir:

This is the 1st time I have written to your mail box and I wouldn't be writing now if I didn't want to get a load off my system.

Well here it is: I have built a *very* efficient arc welder from the starter generator unit that is part of the old Dodges (1918-1927). This car generator-starter unit, when a little work is put on it, can be made to put out 40 volts and 75 amperes (approx.). The voltage across the arc is approx. 20 or thereabouts. I use a 1/16 or 3/32 welding rod on this outfit.

(Continued on page 26)

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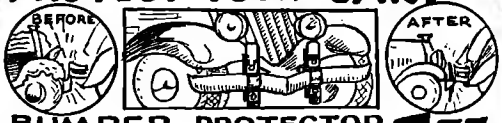

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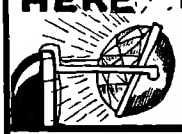

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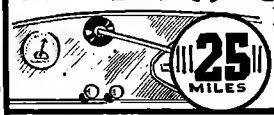

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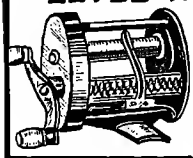

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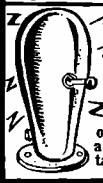

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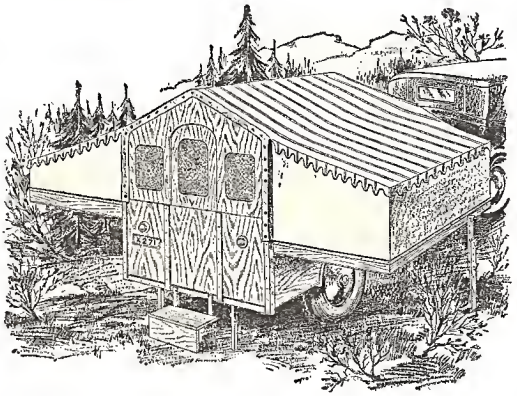

This Bungalow on Wheels

—sleeps four adults
—costs $30 or less to build
—folds up to car width when on the road
—carries all household equipment, including running water and built-in beds.
—is completely weatherproof
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NO WONDER this trailer has proved to be the most phenomenally popular how-to-build project in years! Literally hundreds of them have been built since the plans originally appeared in the May, 1932, issue of Modern Mechanix and Inventions. The illustration above shows the outfit in camp for the night, unfolded as a house. For traveling, the side balconies are folded inward, the roof top down, and presto! you have an easily towed trailer which allows complete vision from the rear window of your car.

Chassis of the trailer is built up out of the front axle unit of a junked car—almost any type will do. Only ordinary tools are required. Roof is of waterproof canvas. Bedsprings are contained in the projecting balconies. Provision for running water and household equipment is made.

BLUEPRINTS show the trailer layout with all dimensions. Prints are large size, specially made for shop use, easy to read. Any man who can tell a hammer from a saw can put this trailer together to last for years. Price of blueprints, postpaid **$1.00**

Modern Mechanix and Inventions
529 S. Seventh St. Minneapolis, Minn.

ANDY'S SHOP MAIL BOX

(Continued from page 24)

The main changes are namely: 1, cut ventilation holes in end; 2, put an additional brush on the ring (making 4); 3, make two shunt coils of No. 21 S.C.E. wire; 4, put a small fan on the pulley to keep armature from getting hot. Also make a reactor of No. 10 S.C.E. wire.

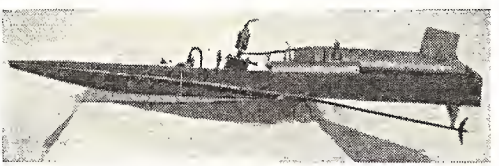
Now if you will put this letter in your "colyum" and some of the fellows want to know more about this arc welder, I will be glad to correspond about coils, wire, reactor, and so forth.

Also if any one thinks that it would be "too muchee trouble" to make the different parts I can furnish them at near-cost. If you think it's worth it, I hope to see this letter in print.

Yours respectfully,
R. M. Willson.

. . . and by the way gents, don't expect an answer from this friendly gentleman unless you send along a piece of blank paper and a stamped, self-addressed envelope. One man who offered to volunteer answers coughed up nearly ten bucks for stamps before he yelled for help. I don't know how many of the quarter million answered his buz, but I know I get pahlenty mail myself.

Annahoo, I promise more on arc welding in subsequent isssues. There's a two-bit word for you, — subsequent.



Here's a miniature steam powered hydroplane built by Cy Smith, of Oakland, Cal. Cy is quite a boat bug, and tells about her in his letter. Similar plans ran in Packmag No. 2.

Here's something free, and darned good at that: do you know how to sharpen a knife? Do you know why oil is used on a stone? Betcha don't know that a lathe tool will cut worlds smoother and hold an edge longer if it is edged with a stone instead of merely sharpened on a wheel. And do you know that some "oilstones" are made, and others are natural rock?

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Facts and Fallacies About Drowning

(Continued from page 63)

have no buoyancy. If a part of back or head appears above water, you can be taught to float.

From a position of treading water, take a deep breath and move chin slowly up and back until nose and mouth are out of water. The body will sway back and forth in its upright position to its balance point, which is your best position for floating, whether vertical, or at an angle, or horizontal. When necessary to exhale, do so quickly, taking a breath again at once, thus keeping the lungs filled with air as much of the time as possible.

In horizontal floating, position of arms and legs affects balance very materially. The most buoyant position is that with arms outstretched on surface of water and extended further back than shoulders, soles of feet together, and knees bent apart as in frog kick.

Last but not least, on our list is fallacy number ten, which says that you usually can remove fear of the water from a beginning swimmer by throwing him overboard. Not so. The thing that prevents most people from learning to swim is fear, and if at the very outset while training a person to swim you add to his fear, then you may unwittingly rob him of his chances of ever learning to swim.

What's the best way to approach a drowning person? Usually from the rear. Swim to a point directly behind him, reversing position of your body and reach one hand under his chin. Clutching point of chin in palm of hand, and bracing forearm against shoulder to control head, you tilt it backward as you kick vigorously and stroke free arm to bring subject to level. At first possible moment after levelling, go into carry position.

When it's difficult to approach from the rear, either the underwater or the surface approach can be used.

For the underwater approach, swim to about six to ten feet in front of the victim, dive under to his foot level and grasp him at about the knee level, turning him around. Keep deep enough to avoid being clutched by the subject. During the surface dive and in reaching for the victim's knees, keep your arms straight before you so he can't grasp you with his legs. After turning the subject, remain behind him and, without losing touch of him, come to the surface, and as soon as your head is out, level him.

The surface approach is recommended only when the subject's eyes are under water. Swim towards the victim, facing him and reversing your position. Reach in with your right hand and grasp his right wrist, or with your left hand grasp his left wrist. Then use a powerful scissors kick and stroke, pulling subject to you and turning him around. Clutching his chin with your free hand, level him and proceed as in the rear approach.

Now, let's consider the important carries: In all of them the subject's face must be kept out of water. For the head carry cover subject's ears with the palms of your hands, thumbs toward eyebrows, so that your middle finger rests along his jaw-bone on each side. Tilting head backward, swim on back, using frog or scissors kick.

(Continued on page 28)

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☐ C.O.D. I enclose $5. Please send KI-YAK Kit C.O.D. I'll pay Express Co. balance of cost, plus C.O.D. fee, slight shipping charge.

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Facts and Fallacies About Drowning

(Continued from page 27)

You should be in a half-sitting position, arms straight ahead, head almost vertical, chin on chest, upper body about 45 degrees and legs nearly parallel to the surface and about three feet below it.

The cross chest carry puts the victim completely under control. From position back of him reach across his shoulder and chest, placing your hand under his farthest arm pit. Hold subject so that your hip is directly under the center of his back, and his shoulder tight under your arm-pit. Swim on your side, using scissors kick and sidearm pull. Keep victim's head well out of water and hold him firmly in place with elbow against his chest.

The hair carry is particularly effective when used by a slight rescuer to tow a bulky subject through the water. From position back of victim place your hand at crown of his head, your fingers toward his forehead, grasping a handful of hair. With your hand in this position he will not roll over. Swim on your side with sidearm pull and scissors kick, and keep your holding arm straight out.

As its name suggests, the tired swimmer's carry is used only for a tired swimmer and not for a struggling, frightened, one. The rescuer swims to the subject saying: "Put your hands on my shoulders"; "Keep arms straight"; "Lie on your back"; "Spread feet apart"; "Watch my face"; as he slowly swims breast stroke directly toward the subject, turning him in a half circle, and heading him towards shore.

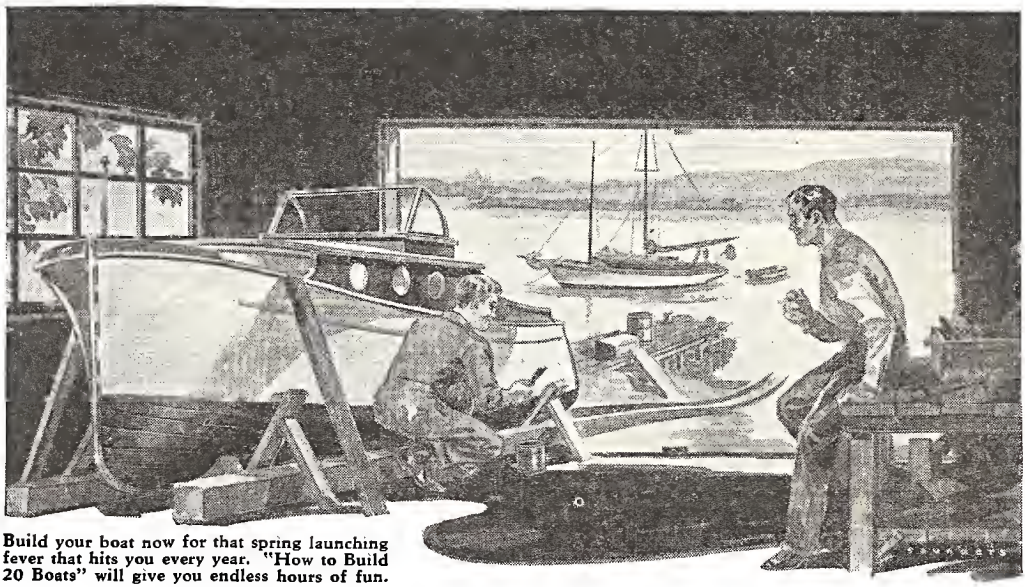
But what should the rescuer do if the drowning person is struggling violently and is in a highly nervous and dangerous state? It is best simply to wait for him to exhaust himself before approaching him, and if you're wise, you'll practice some of the release methods for various types of holds.

In the front strangle hold you are grasped tightly around the neck from the front. If his head is over your right shoulder, put your right hand on his right cheek, little finger against side of nose with thumb hooked under angle of lower jaw, and push his head toward your right and at the same time put your left hand on victim's encircling arm above the elbow and lift vigorously, following through and pushing toward the right. Then duck under subject's arm as you raise it, pushing against face and lifting elbow until victim is turned with back to you. Continue to hold the elbow until you get your hand off the face, under the arm pit and back on the chin again to level. Then drop the elbow hand to the hip and elevate the body as in the rear approach.

During the back strangle hold you're grasped around the neck from the rear. Protect your throat by grasping subject's nearest hand and twist it down and in toward his body, pushing up elbow of the same arm with your free hand. Turn your face away and duck under this arm as you raise it and continue twisting subject's hand until he is turned back to you. Use other hand for chin pull to get subject's body flat on surface and swim with hand that held wrist. Shift to cross chest carry.

An embarrassing stunt of the struggling victim

(Continued on page 30)



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"Avon" cottage is 12x20, including porch. Living room 12x14½ to accommodate two single beds. Estimated cost of materials, taking advantage of present-day market prices, is $95. If you hire a carpenter to build "Avon," the cost should run around $240. Blueprints consist of a set of four, each 16x26 inches done to a scale of ½-inch to one foot. Primary aim of this series of plans is to obtain lowest cost with sound construction, using standard materials. Price of blueprints, including bill of material $2.50

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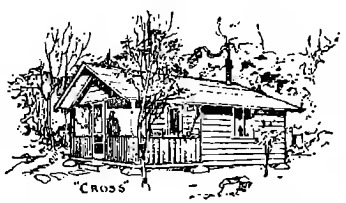
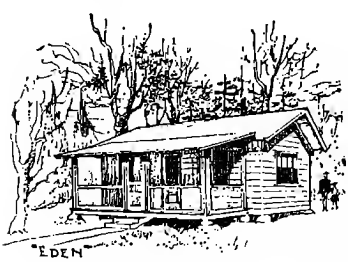


Including the porch, "Cross" cottage is 16x20. The living-room is 12x16, arranged for two beds. Estimated cost of materials, $115; cost complete if you hire it built, $310. Plans of all cottages show use of insulating board if you want to use the cabin as a hunting lodge in fall or winter. Blueprints of "Cross" consist of a set of four, sent postpaid with complete specifications and bill of material for $2.50



"EDEN"

Outside dimensions of "Eden" are 22x24. The main part is 14x24, containing the living room, and there are two bedrooms, each of which will hold two single or one double and one single bed. Two closets with plenty of cupboard space and a breakfast nook. Estimated cost of materials, $200; cost if you hire it built, $600. Blueprints for "Eden" contain six to a set, each 16x26 inches, giving complete specifications and bill of material. Price postpaid $4.00

A special fireplace blueprint, showing construction of an ideal cabin fireplace, with full directions, is available at $1.00

There are four other cottage plans in this series, not shown above. "Bard" is 12x24, costs $110 for materials; "Dream" is 16x24, including porch, materials cost $125; "Forest" is 20x40, with fireplace, materials cost $400; "Nautilus" is a cabin that grows with additions, full size materials cost about $450. Address orders and inquiries to

MODERN MECHANIX AND INVENTIONS
Blueprint Department
529 S. Seventh Street, Minneapolis, Minn.

Facts and Fallacies About Drowning

(Continued from page 28)

is to get the "double grip on one wrist." Let's suppose he grasps your right wrist with both hands. Put your left hand, which is free, on the subject's left with thumb on top and fingers under, ready to pull as soon as your foot is in position. The foot is used to push on the opposite shoulder as the arm is pulled toward you, retaining the hold on the wrist to level subject by hand pull.

Use left foot against subject's right arm pit, bringing it over subject's arms. Be careful about kicking victim in chest or breast. Straightening the legs as you pull with the left hand gives the necessary force to break the hold. The right wrist naturally turns against the thumb which is holding it.

But is there anything you can do to save two people clinging together in a front strangle hold? Yes. First of all swim to a point directly behind one of them (preferably the weaker swimmer) and place your hand on his chin. Push down with forearms to sink subject, raise one foot over locked arms, placing foot against chest below throat of subject facing you, straighten your leg, push down and pull up, separating the two. Avoid kicking. Carry subject you are holding to safety.

Should the inexperienced life-saver try to utilize methods of artificial respiration? Generally speaking, no. However, by painstaking practise you can teach yourself the standard Prone Pressure Method. And in cases of extreme emergency you should be able to utilize it to advantage.

However, here are some important precautions: oftentimes inexperienced or excited persons try to administer artificial respiration when there is no need for such treatment. It is required only when the victim is unable to breathe.

Now, the prone pressure method is an effective imitation of the natural process of breathing because it utilizes the diaphragm and the muscular elasticity of the chest to produce a natural inhalation of air.

Go to work instantly. First lay the patient on his belly, one arm extended directly overhead, the other arm bent at the elbow and with the face turned outward and resting on hand or forearm, so that the nose and arm are free for breathing.

Kneel straddling the patient's thighs with your knees placed in a comfortable and natural position. Place the palms of the hands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position and the tips of the fingers just out of sight.

With arms held straight, swing forward slowly, so that the weight of the body is gradually brought to bear upon the patient. The shoulder should be directly over the heel of the hand at the end of the forward swing. Don't bend your elbows. This operation should take about two seconds.

Now immediately swing backward, so as to remove the pressure completely.

After two seconds, swing forward again. Thus repeat deliberately twelve to fifteen times a minute the double movement of compression and release, a complete respiration in four or five seconds.

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MODERN MECHANIX
EDITORIAL OFFICES, 529 SOUTH SEVENTH STREET

Two British planes, outfitted with cameras, oxygen tanks, and electrically heated flying suits, surmounted the peak of Mt. Everest, world's highest mountain, early in April, taking pictures of the peak from a vantage point never before enjoyed by human eyes. Drawing shows route of planes, which had to battle terrific winds at summit. A British expedition is now in the field preparing to make another attempt to scale the mountain on foot, a feat whose attempt has cost the lives of scores of mountaineers.

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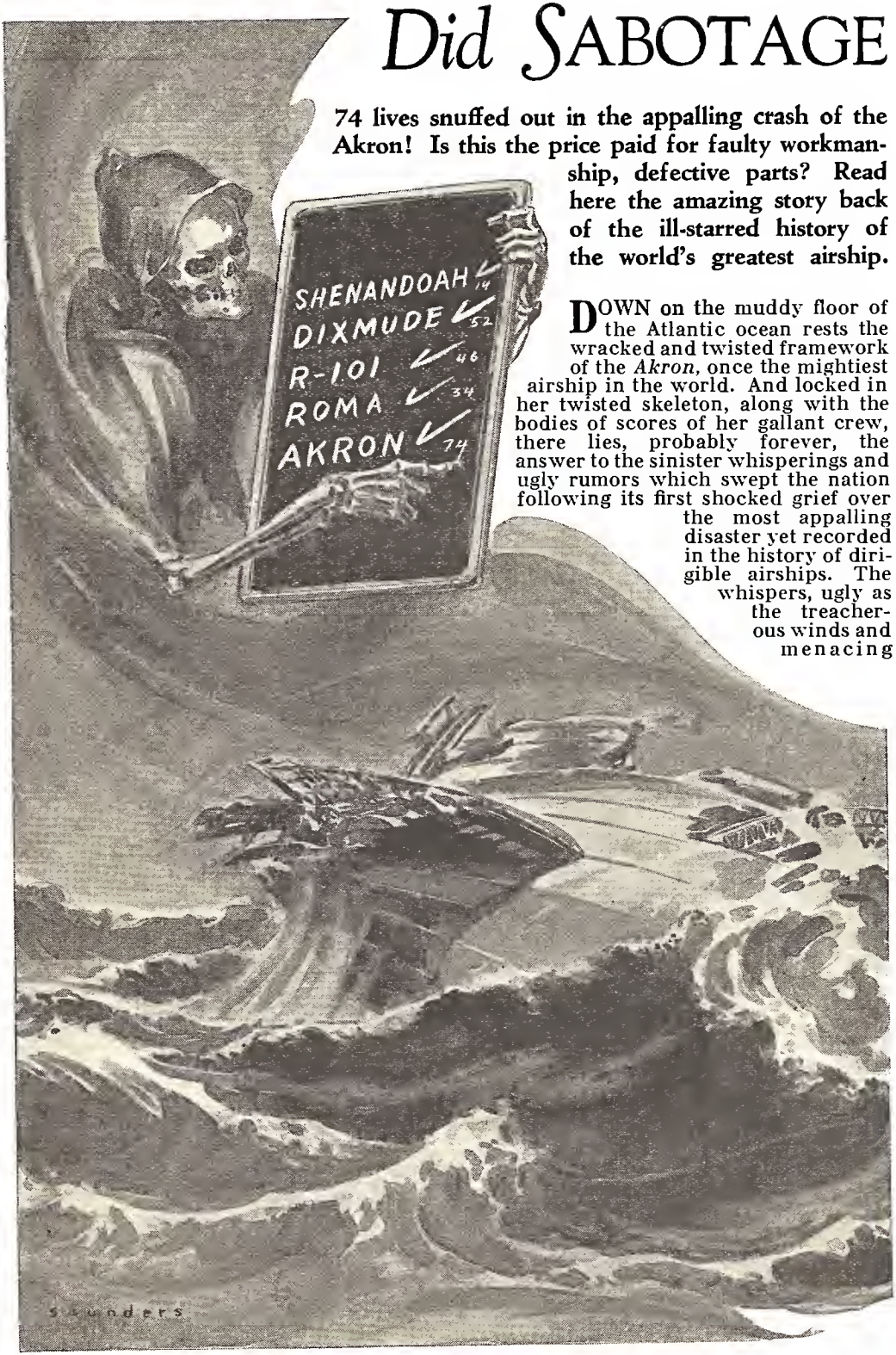
Did SABOTAGE

74 lives snuffed out in the appalling crash of the Akron! Is this the price paid for faulty workmanship, defective parts? Read here the amazing story back of the ill-starred history of the world's greatest airship.



DOWN on the muddy floor of the Atlantic ocean rests the wracked and twisted framework of the *Akron*, once the mightiest airship in the world. And locked in her twisted skeleton, along with the bodies of scores of her gallant crew, there lies, probably forever, the answer to the sinister whisperings and ugly rumors which swept the nation following its first shocked grief over the most appalling disaster yet recorded in the history of dirigible airships. The whispers, ugly as the treacherous winds and menacing

WRECK *the* AKRON?

by **RALPH BLAIR**

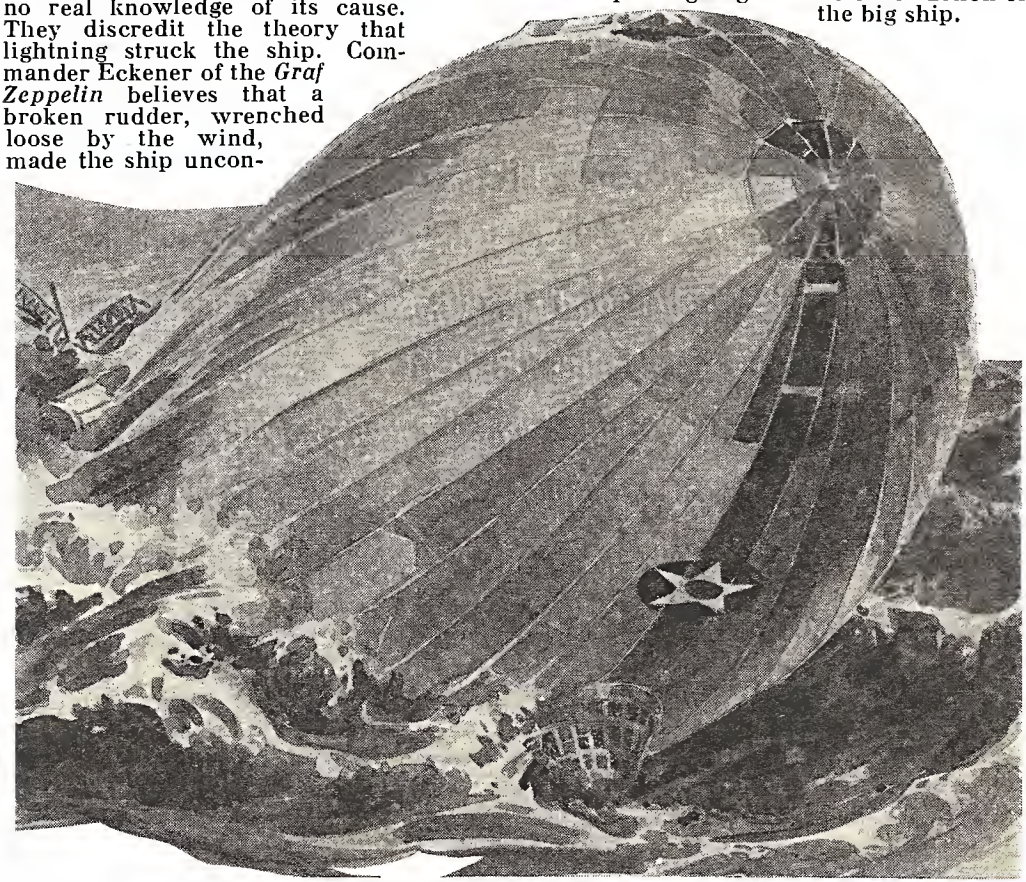
thunderheads which flung the ship to its doom, say: Sabotage wrecked the *Akron!* Destruction snatched at the *Akron* because defective rivets, second grade materials, incompetent and deliberately inferior workmanship sapped at its proud strength so that, in the stress of a storm, the ship's back was broken, its rudder lost, or it collapsed in other vital parts.

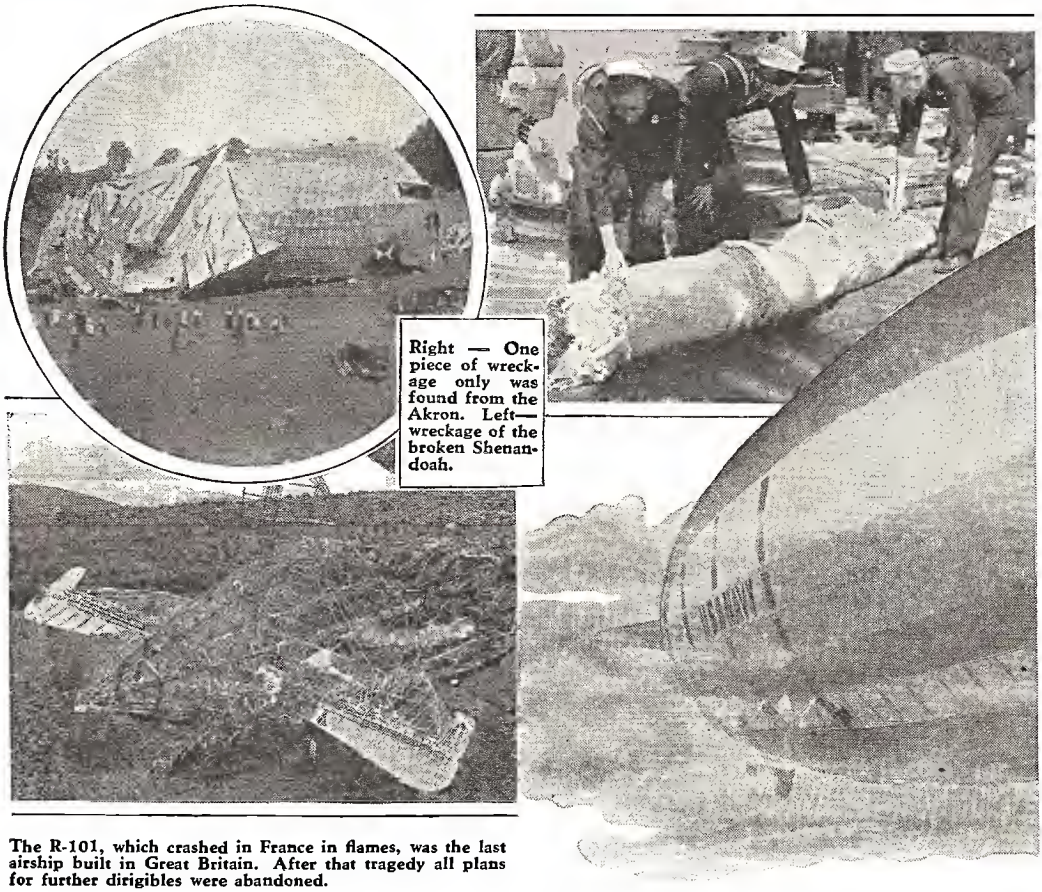
And even above these whispers is the pitiful question on the lips of those whose loved ones perished: Did this thing have to be? It finds an echo in the hearts of millions of Americans; it has prompted members of Congress, remembering the staggering disasters that, one after another, have befallen the world's dirigibles, to declare that no more such craft will ever be built. That qucstion probably will be hotly argued in coming months, but it is outside the scope of this article.

The point is—*did* sabotage wreck the *Akron*? The wreckagc which might contain the evidence lics inaccessibly in Davy Jones's locker. Survivors of the crash have no real knowledge of its cause. They discredit the theory that lightning struck the ship. Commander Eckener of the *Graf Zeppelin* believes that a broken rudder, wrenched loose by the wind, made the ship uncontrollable. The back of the ship may have broken when opposing currents caught it; rivets defectively installed (there were 6,000,000 of them in the ship) may have given way; the giant rings and girders of duraluminum, inadequately tested for stresses, may have collapsed.

The probability that the *Akron was* defectively constructed is given color by the appalling accuracy of the prediction that the ship would go the way of the *Shenandoah* which was brought out a year ago in an investigation of reports that sabotage had been committed in the *Akron.*

I have before me, as I write, the official government report of the proceedings at that investigation. Mr. E. C. Davidson, secretary of the Machinists' Union, tells how W. Van Underwood and Lieut. Col. E. C. McDonald, both employed in the construction of the *Akron,* appeared in his office to ask advice as to how to proceed in presenting facts to the proper authorities to the effect that faulty material and faulty workmanship was going into the construction of the big ship.





Right — One piece of wreckage only was found from the Akron. Left—wreckage of the broken Shenandoah.

The R-101, which crashed in France in flames, was the last airship built in Great Britain. After that tragedy all plans for further dirigibles were abandoned.

"Col. McDonald" (quoting Mr. Davidson) "stated that the construction of the *Akron* was simply the building up of a situation that would end as the *Shenandoah* had; that he had had experience in the construction of the *Shenandoah*, and that he was of the opinion that the faulty workmanship that he had personal knowledge of, and faulty material that was going into the construction, was a real menace to the *Akron*."

How devastatingly accurate a prediction! The fact that it came to pass with more horrifying completeness than Col. McDonald could have imagined is proof in itself that he was not actuated by an exaggeratcd sensationalism, but by the shame of a good craftsman who sees a mechanism on which human lives depend, flimsily fashioned.

Specifically, the charges were that defects in construction were covercd with paint so that naval inspectors could not discover them; that fractured rivets wcrc glossed over in this way, fully 50 per cent of thcm being defectivc—too short, causing an invisible break in the metal. Certain reinforcing plates on the upper catwalk were omitted which were designed to protect against a strain of 300,000 pounds.

The grim word "sabotage" raises its head in connection with the activities of a certain Paul Kassay, a naturalized citizen of German extraction. He was a workman employed on the *Akron* job, who applied for his position as a skilled mechanic and was hired as an ordinary workman.

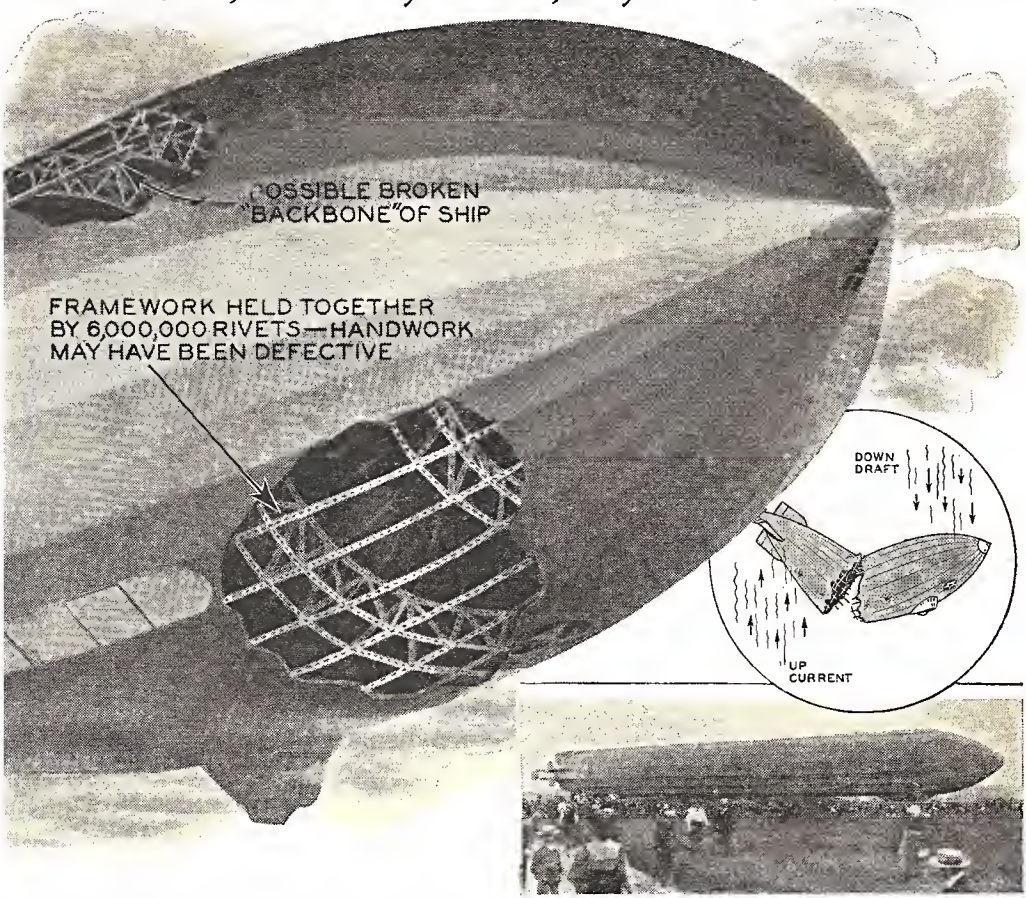
Agents of the Department of Justice arrested Kassay for questioning in connection with work he had done on certain bombing planes manufactured by the Great Lakes Co. He was discharged from the employ of the *Akron* builders when he evidently made statcmcnts to Department of Justice agents to the cffect that he had intentions of not being a good workman or of practicing sabotage on the *Akron*. He was never brought to trial because of lack of a law in Ohio under which he could be prosecuted constitutionally.

Yet it is significant that a complete report of the incident was never given to the public. Listen to the testimony of Lieut. T. W. G. Settle, inspcctor of naval aircraft on the *Akron* job, when questioned as to his knowledge of the Kassay case:

"At the time I had a quantity of information on the case . . . that it would be inadvisable to give in public."

Mr. McClintock (Congressional chairman of investigating committee): "You do not

Fractured Rivets, Deliberately Installed, May Have Caused Fatal Crash


POSSIBLE BROKEN "BACKBONE" OF SHIP
FRAMEWORK HELD TOGETHER BY 6,000,000 RIVETS—HANDWORK MAY HAVE BEEN DEFECTIVE
DOWN DRAFT
UP CURRENT

In circle, drawing shows how storm currents could break backbone of Akron, especially if parts were defective. Photo immediately above is that of the first big Zeppelin, which ascended in Germany on Aug. 4, 1908, and was destroyed the following day in a violent storm—grim foretaste of the fate of most of its later sisters.

have to answer this if it violates any secret."

And later, another excerpt:

Mr. McClintock: "Have you ever received any information of any organization which might have prompted him (Kassay) to be guilty of that which has been charged?"

Lieut. Settle: "That, sir, is a matter I had better not answer, I believe."

And still later, this statement by Lieut. Settle: "I will not say there was not any attempt at sabotage, but I am sure that attempted sabotage, if there was an attempt, was not successful."

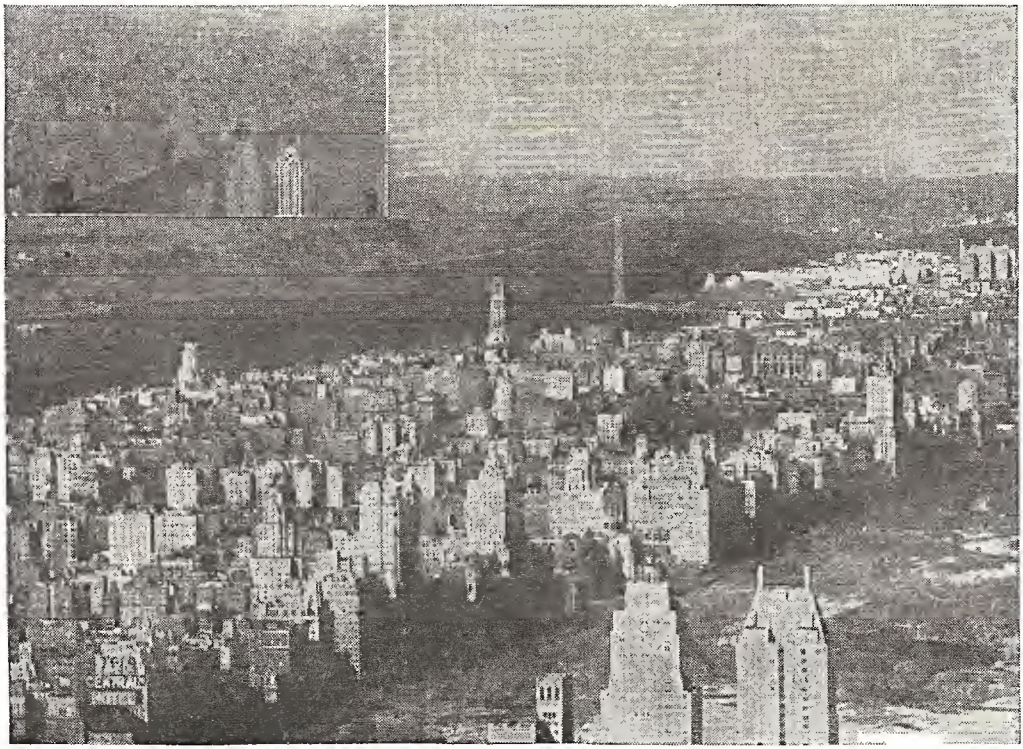
How is one to read between the lines of such testimony? The natural conclusion is that there *was* a sabotage attempt; that perhaps it was discovered in time and supposedly repaired; that for reasons of public policy the matter was carefully kept secret. Naturally it would be thought inadvisable to let Americans know that their proud airship, hailed as the greatest ever built, might conceal any number of hidden weaknesses.

International jealousies, too, were involved. The *Akron* fundamentally was an instrument of war, carrying heavy armaments, with a fleet of airplanes in its heart which it could launch at will. Primarily designed as a sea scout, and as such a valuable unit in defending our shores against possible aggression of foreign navies, it was the only ship of its type in the world and was not looked upon too kindly by foreign governments.

So devious are the ways of diplomats, so widespread the forces of espionage and secret agents which spread their sinister network through all nations, including our own, to an extent that would amaze the American citizen, that it is more than likely an attempt at sabotage which would eventually wreck the *Akron* was made. This is the definite conclusion left by an impartial reading of the cautious answers made by officials in the *Akron* investigation.

That is the tragedy of the *Akron*—a tragedy whose full meaning we probably shall never know, unless the Navy succeeds in locating the wreck by dragging the shallow waters off Barnegat Bay where she went down. Not until then can the mute skeleton settle or allay the whispers which enshroud it.

Infra-Red Photo Pierces Haze 44 Miles

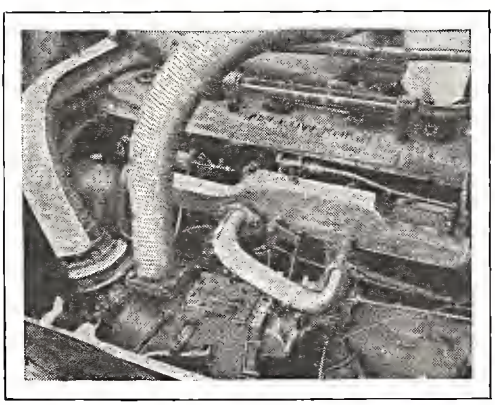


How infra-red camera eye pierces haze is seen in photo of New York City. Insert shows photo made with ordinary plates.

THE amazing penetrating power of the infra-red camera eye is vividly illustrated in a photograph made recently from top of the lofty Empire State Building, in New York. This photograph, seen above, which shows you the hills 44 miles away, was made possible by the use of a special long range camera equipped with infra-red filters and supplied with infra-red ray sensitive plates. Rays are invisible to the eye.

Compare the large photo with the small one in the upper left hand corner. This latter was taken with the same camera and without the filters, and is the view seen by the naked eye. Note that the haze completely obscures the background, while in the large photo the beauties of the upper Hudson stand sharply revealed.

Attachment Burns Furnace Oil in Gas Auto Motors to Cut Fuel Bills



How Thurherator is installed on 6-cyl. sleeve valve motor.

THE burning of comparatively inexpensive furnace oil for fuel in gasoline engines is said to be made possible by the development of a new device known as a "Thurberator."

How this new device is installed is illustrated in the photo at the left. Tests on a 6-cylinder bus engine showed that the mileage per gallon of fuel was 18 per cent greater than the fleet average. Exhaust gases showed less than one per cent carbon monoxide gas, as against the five per cent said to be given off by gasoline-fueled engines. This represents an important advance when it is remembered that carbon monoxide is an extremely deadly gas, causing hundreds of deaths annually.

The "Thurberator" has been under development for the past four years.

Sun-Melted SAND *for* AUTO ROADS

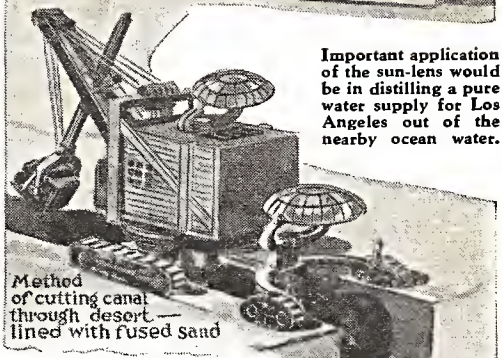
Patented sectional glass lens for concentrating terrific heat rays of sun
Los Angeles
Steam stacks for distilling pure water
Salt water from ocean
Sun-lens

Rays of the sun, concentrated through a 30-foot burning glass, would vaporize metal instantly. The lens shown above illustrates the construction principle patented by Mr. Beach.

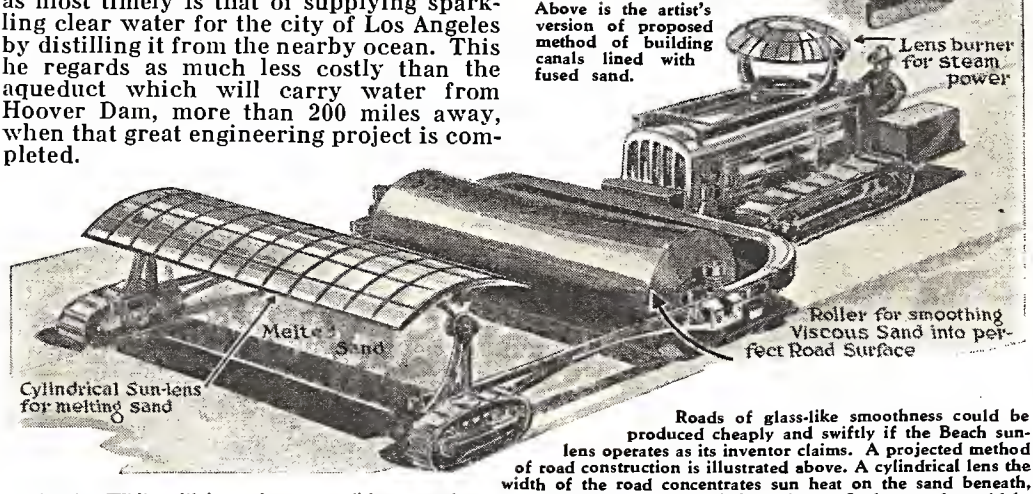
ONE of the most astonishing ideas ever advanced to the American public comes from Will W. Beach, of Los Angeles, California, who, as holder of patents on a sectional method of constructing 30-foot lenses, proposes that these immense burning glasses be used to harness the sun's rays for converting ocean water into steam (leaving pure water and salvaging salt, iodine, flour gold, etc.), for fusing sand into an impervious lining of canals dug through deserts to bring sea water for irrigation, and for melting sand which can be rolled out into a perfectly smooth surface for auto highways.

Various interesting applications of Mr. Beach's ideas are presented by the artist on this page. One which the inventor regards as most timely is that of supplying sparkling clear water for the city of Los Angeles by distilling it from the nearby ocean. This he regards as much less costly than the aqueduct which will carry water from Hoover Dam, more than 200 miles away, when that great engineering project is completed.

Important application of the sun-lens would be in distilling a pure water supply for Los Angeles out of the nearby ocean water.



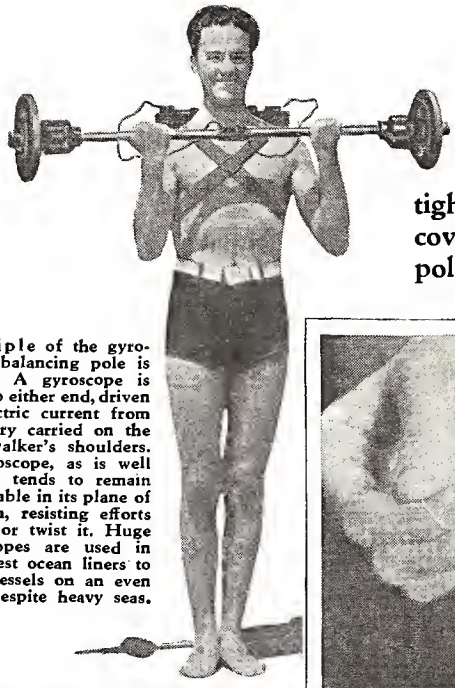
Above is the artist's version of proposed method of building canals lined with fused sand.


Lens burner for steam power
Melted Sand
Cylindrical Sun-lens for melting sand
Roller for smoothing Viscous Sand into perfect Road Surface

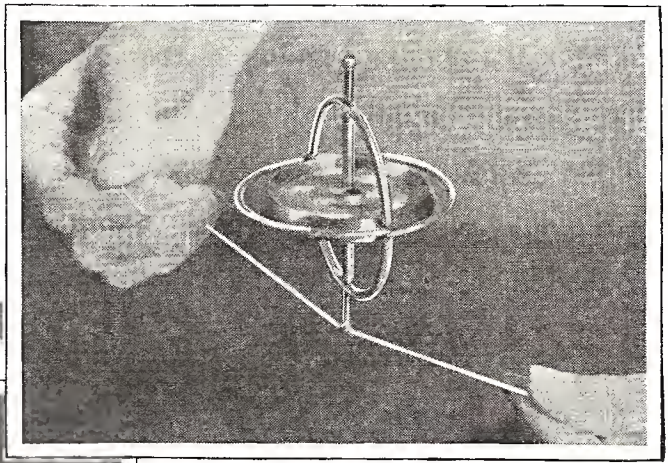
Roads of glass-like smoothness could be produced cheaply and swiftly if the Beach sun-lens operates as its inventor claims. A projected method of road construction is illustrated above. A cylindrical lens the width of the road concentrates sun heat on the sand beneath, melting it. While still in a viscous condition, a roller passes over it and smooths it into shape. Such a road would be practically immune to the ordinary wear and tear of traffic. A tread on the roller would make the road skid proof.

CAN THIS

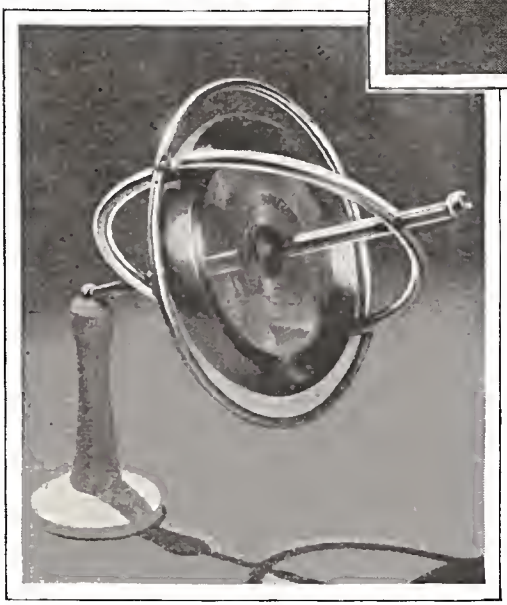
$50 in cash awaits the writers of the best letters explaining whether or not the tight rope walker pictured on this month's cover, equipped with a gyroscopic balancing pole, can possibly lose his balance and fall.



Principle of the gyroscopic balancing pole is simple. A gyroscope is fitted to either end, driven by electric current from a battery carried on the rope walker's shoulders. A gyroscope, as is well known, tends to remain immovable in its plane of rotation, resisting efforts to tip or twist it. Huge gyroscopes are used in the latest ocean liners to keep vessels on an even keel, despite heavy seas.



Actual photograph of a toy gyroscope, showing how perfectly it keeps its balance on a piece of string. Can this ability be successfully harnessed by the tight rope walker?



WHAT CAN A GYROSCOPE DO?

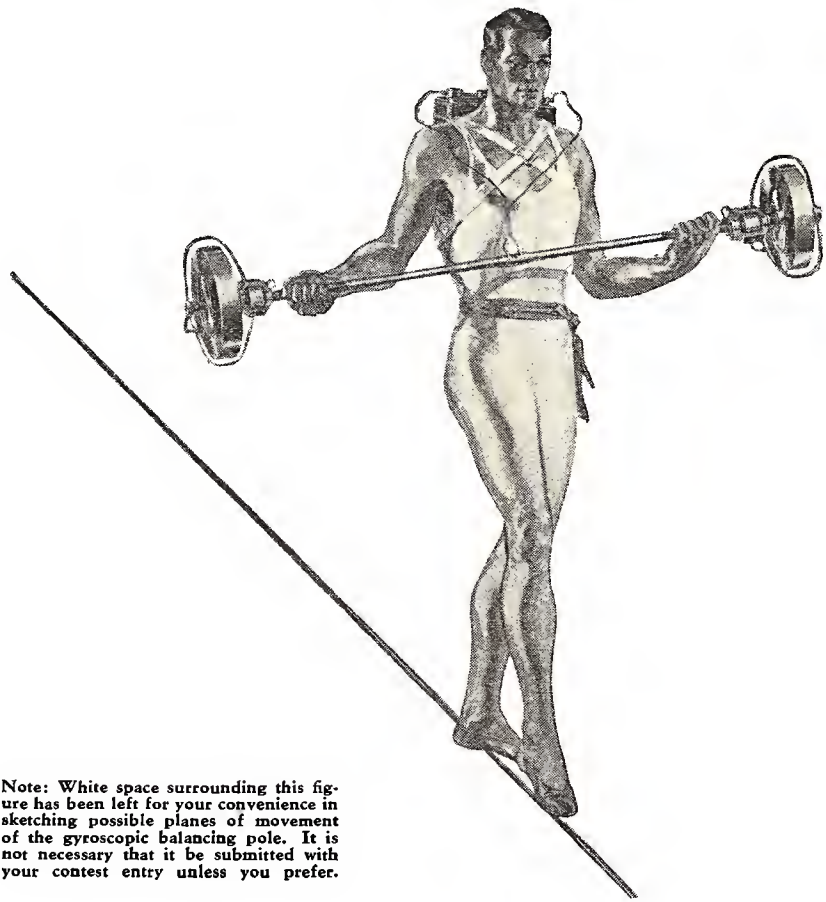
Two photographs of a toy gyroscope above give some hint of the way in which these amazing instruments contradict the law of gravity. In the one photo the tip of its axis shaft rests on a pedestal, around which it revolves parallel to the floor, and gravity is powerless to pull it from its precarious perch as long as the wheel revolves at high speed. A large gyroscope cannot be pushed over by the strongest man, and huge ones used in ocean liners handle 50,000 ton ships with ease.

WONDER of wonders is the gyroscope. It keeps ocean liners on a steady keel, it steers airplanes on a level course. It generates within its whirling wheel a strange force which seems to nullify the law of gravity. A strong man, putting his shoulder against a whirling gyroscope, cannot tilt it an inch from its plane of rotation.

So—why not harness this strange balancing force to remove the last bit of peril from the job of the tight rope walker? A gyroscopic balancing pole pictured on this month's cover of MODERN MECHANIX AND INVENTIONS shows an adaptation of the idea. It is not expected that circus performers will adopt the innovation immediately; it is merely a suggestion involving well-known scientific principles which will intrigue the puzzle addict and the contest fan.

A number of possibilities will at once assert themselves. The pole simply has one gyroscope on each end, driven by current from an electric battery carried over the performer's shoulders. The wires enter the center of the pole where they do not interfere. Should both gyroscope wheels revolve in the same direction? Will the walker be able to lift the pole in three directions, in two, or one? What will happen if he lets go with one hand? Will he be able to push the pole straight ahead of him, and will it resist twisting efforts and thus enable him to stand upright as if he supported himself

Tight Rope Walker FALL?



Note: White space surrounding this figure has been left for your convenience in sketching possible planes of movement of the gyroscopic balancing pole. It is not necessary that it be submitted with your contest entry unless you prefer.

by bracing against a solid anchor? Above all, will it work—will it prevent him from falling from his perch?

For the best answers to the question, "Can the Tight Rope Walker Fall?", MODERN MECHANIX AND INVENTIONS will pay $50 as follows: To the writer of the best letter, in the estimation of the judges, $15; to the authors of the five next best letters, $5 each; and additional awards of $2 each to the five writers of the third best letters.

Letters should not be over 400 words in length (the briefer the better, as long as essential points are covered) and should give sound answers to the question, "Can This Man Fall?" Information on gyroscopes in more detail can be obtained from any encyclopedia or public library. Entries must be postmarked not later than July 1, 1933.

Decision of the judges is final. In case of ties, duplicate prizes will be awarded. Employees of this magazine and their families, of course, are not eligible to compete, but beyond this the field is open to everyone. You don't have to be a subscriber to the magazine. You don't even have to buy a copy of the magazine. The drawing above is given for your convenience in figuring out what the gyroscopic balancing pole would do. It need not be submitted with your answer unless you wish to enclose it.

The photographs which show a gyroscope keeping perfect balance on a piece of string, and defying the law of gravity by whirling around parallel to a table top, pivoting on the extreme end of its axis, were taken of a toy model which affords a perfect demonstration of the queer things gyroscopes can do. Professors have written reams on the complicated mathematics of the device, but all you contest letter-writers have to do is to confine yourself to simple fundamentals in answering the question.

Data on "Closed Circulation" Area to Speed Plane Service

Pilot inspecting aerometeorograph which records automatically air pressure, humidity and temperature at all altitudes.

ATTACHING to the under side of a plane wing, a new type aerometeorograph recently introduced may be instrumental in speeding up flying service in Western States. Shown at the left, the device records automatically air pressure, humidity and temperature at various altitudes.

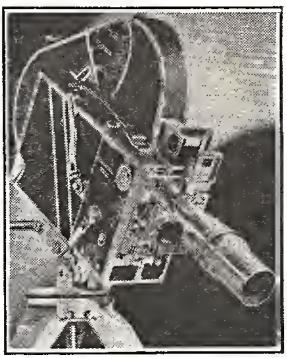
Scientists are using the aerometeorograph to obtain data on a West Coast "closed circulation" area. It is believed cold air creeps close to the ground from Utah plateaus, gets warmed by the Pacific ocean, and flows back to the plateau at altitudes above 20,000 feet. Data obtained will permit flyers to take advantage of fast tail winds and avoid head winds.

Bee Stings Cure Rheumatism

A MODERN scientific method of curing rheumatism by bee stings has been developed by two Viennese physicians. Collecting a quantity of stinging fluid from the storage sacs at the roots of stingers of hundreds of bees, the scientists isolated from it a chemical called saponin. Standardized preparations of this mixture are now available. The artificial bee sting applied by physicians raises a welt, but no serious after effects are felt.

Movies for Advanced Amateur

MAXIMUM cinematic versatility is obtainable from a 16 mm. motion picture camera, recently introduced, which will prove useful to advanced amateurs, engineers, laboratory technicians, etc. Custom made for special requirements, the camera performs all the stunts of its larger brothers.



16 mm. Cine-Kodak which performs all stunts of regular movie camera. Ideal for engineers, etc.

Prongs on Fish Hook Grab Victim

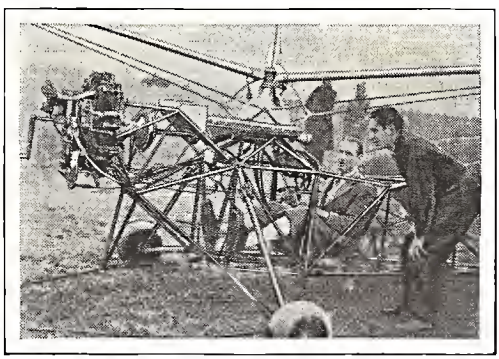
A FISH doesn't stand much of a chance when a new fish hook, displayed recently at the Los Angeles Inventors' Congress, gets hold of it. The catch occurs like this. The unwary and ill-fated fish swims up to take a nibble on the bait, and all of a sudden the three prongs snap down and grab hold. These prongs are released to do their dirty work by the pull on the bait. The quick trigger action of the release assures a catch at the slightest nibble.

How the hook appears when it is set for a catch may be seen in the photo at the left.

When fish nibbles at bait shown above, a trigger releases teeth which grip fish to prevent escape.

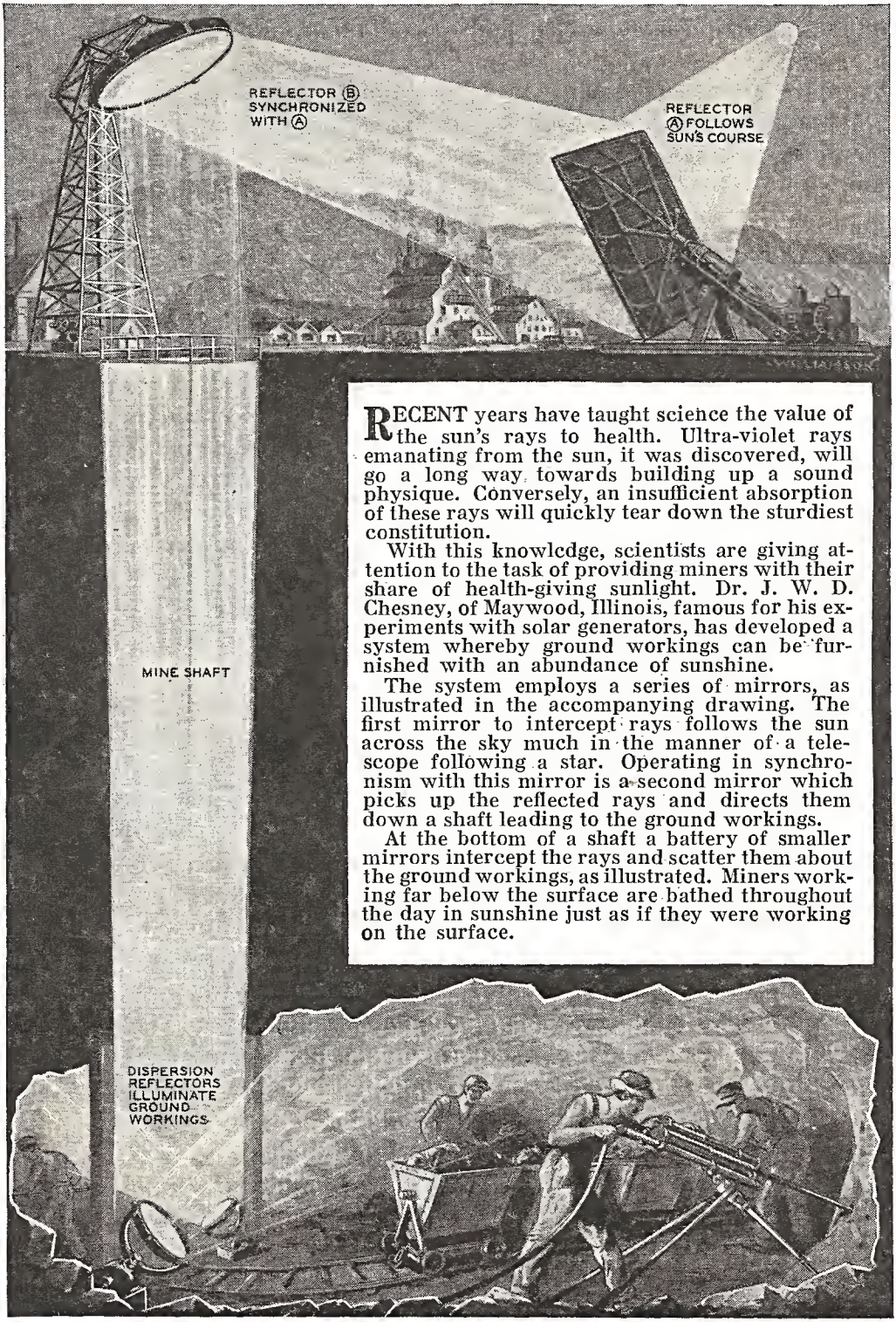
Helicopter Hovers, Flies Backward

ONE of the latest developments in the aeronautical world is a helicopter designed by two young Austrians who claim that their creation will take off and descend vertically, hover in the air, or even fly backwards. In appearance the new type machine resembles its earlier relatives, save that it has rotary blades with small wings not unlike a fish's fin attached to each blade.



Designed by two young Austrians, new type helicopter can take off and descend vertically, hover and even fly backwards.

Sunshine for Miners at Work Underground


REFLECTOR (B) SYNCHRONIZED WITH (A)
REFLECTOR (A) FOLLOWS SUN'S COURSE
MINE SHAFT
DISPERSION REFLECTORS ILLUMINATE GROUND WORKINGS

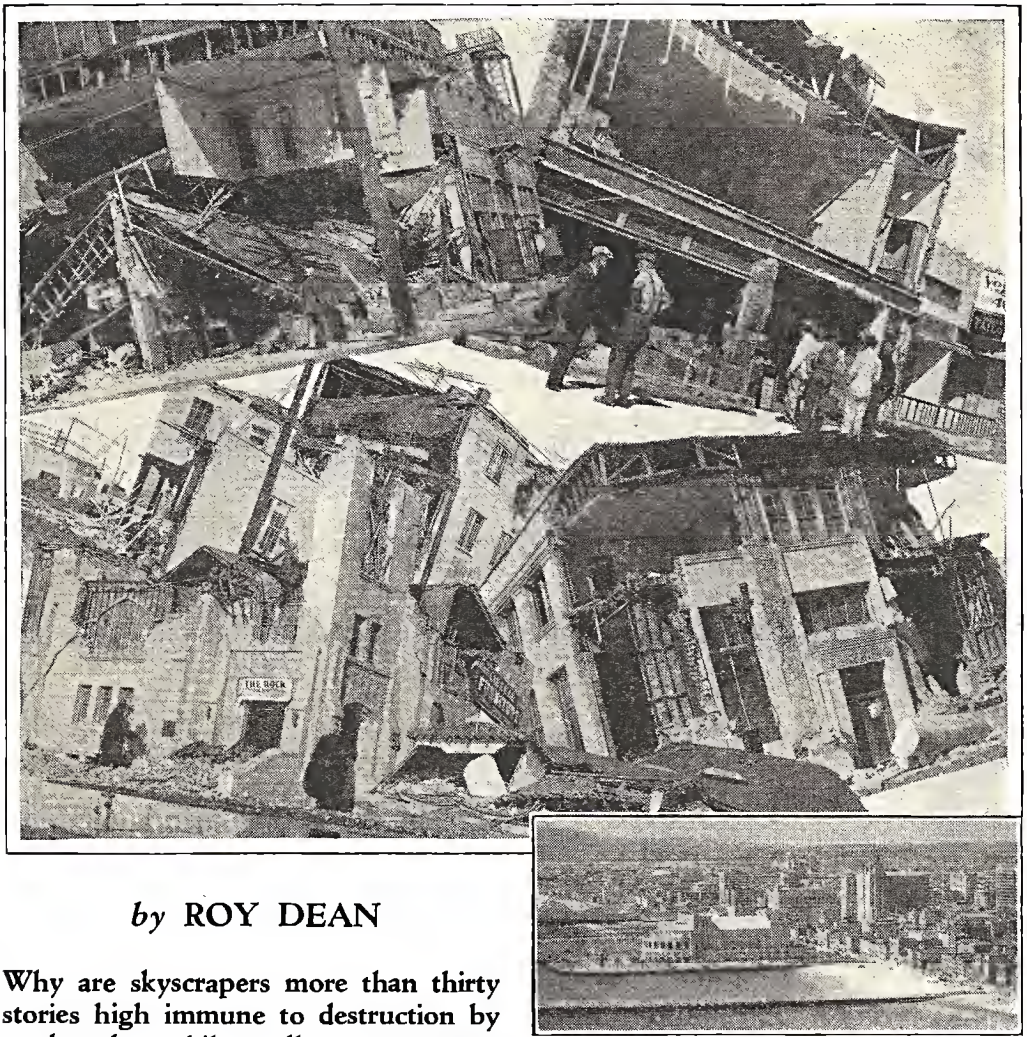
RECENT years have taught science the value of the sun's rays to health. Ultra-violet rays emanating from the sun, it was discovered, will go a long way towards building up a sound physique. Conversely, an insufficient absorption of these rays will quickly tear down the sturdiest constitution.

With this knowlcdge, scientists are giving attention to the task of providing miners with their share of health-giving sunlight. Dr. J. W. D. Chesney, of Maywood, Illinois, famous for his experiments with solar generators, has developed a system whereby ground workings can be furnished with an abundance of sunshine.

The system employs a series of mirrors, as illustrated in the accompanying drawing. The first mirror to intercept rays follows the sun across the sky much in the manner of a telescope following a star. Operating in synchronism with this mirror is a second mirror which picks up the reflected rays and directs them down a shaft leading to the ground workings.

At the bottom of a shaft a battery of smaller mirrors intercept the rays and scatter them about the ground workings, as illustrated. Miners working far below the surface are bathed throughout the day in sunshine just as if they were working on the surface.

Building DEFENSES Against



by ROY DEAN

Why are skyscrapers more than thirty stories high immune to destruction by earthquakes, while smaller structures are reduced to ruins? What secrets of construction will assure the same immunity to dwellers in small homes in quake regions? Answers of scientists to these vital questions, induced by the recent California earthquake, are given here.

OLD Mother Earth, always in motion—trembling 9,000 times each year—manages to set up at least half a dozen earthquakes each season which occasion sufficient property damage and loss of life to be rated as major catastrophes, and to give rise anew to the old question: Can't anything be done about earthquakes?

Not much, it must be admitted, in the way of prevention or prediction. But a great deal in the field of defensive building—that is, in the design of structures which will remain unaffected by quakes, substantial enough to outlast the most violent tremors.

Views of damaged structures in Long Beach, showing devastation of quake on small buildings. Directly above is photo of city, taken after the temblor, showing how perfectly the skyscrapers of modern construction withstood the disaster.

There is nothing mysterious or supernatural about earthquakes. They conduct themselves along well-recognized lines. They represent a force of nature against which engineers can guard in much the same way that they build against windstorms, lightning, and other disasters described in insurance policies as "acts of God."

the EARTHQUAKE Danger

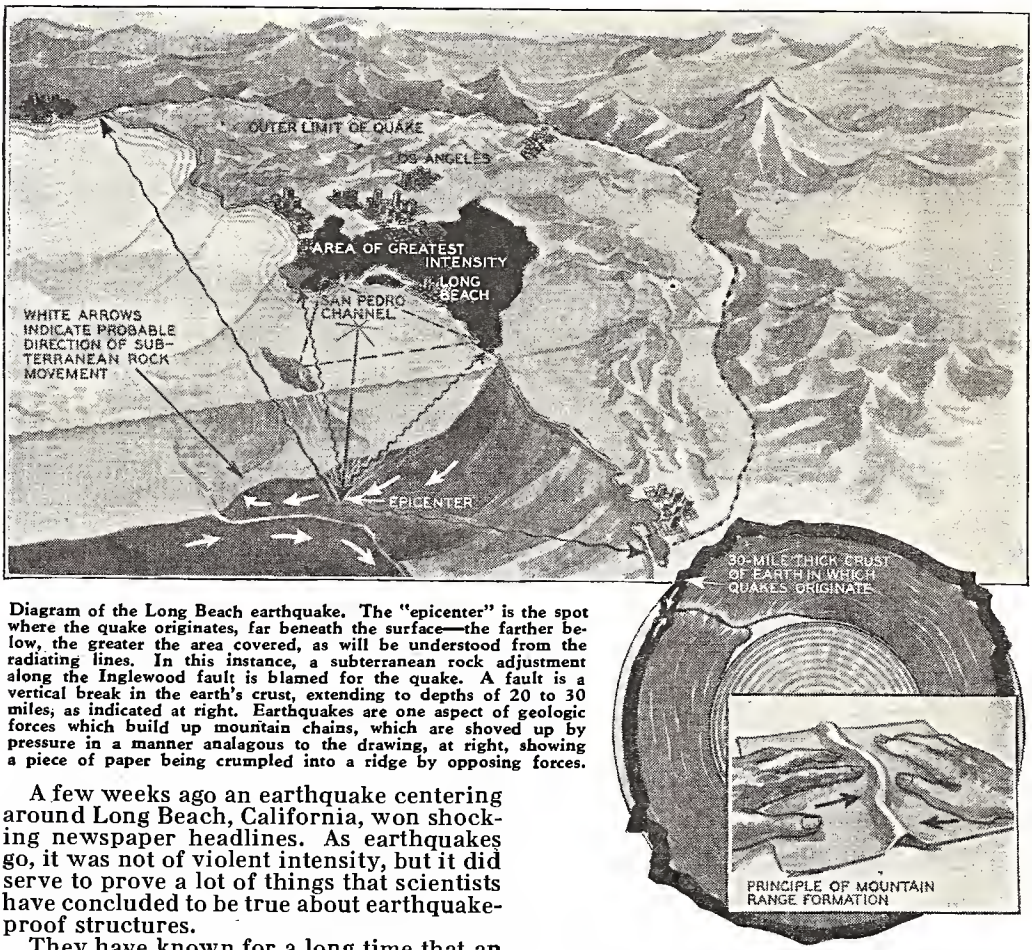

OUTER LIMIT OF QUAKE
LOS ANGELES
AREA OF GREATEST INTENSITY
LONG BEACH
SAN PEDRO CHANNEL
WHITE ARROWS INDICATE PROBABLE DIRECTION OF SUB-TERRANEAN ROCK MOVEMENT
EPICENTER
30-MILE THICK CRUST OF EARTH IN WHICH QUAKES ORIGINATE
PRINCIPLE OF MOUNTAIN RANGE FORMATION

Diagram of the Long Beach earthquake. The "epicenter" is the spot where the quake originates, far beneath the surface—the farther below, the greater the area covered, as will be understood from the radiating lines. In this instance, a subterranean rock adjustment along the Inglewood fault is blamed for the quake. A fault is a vertical break in the earth's crust, extending to depths of 20 to 30 miles, as indicated at right. Earthquakes are one aspect of geologic forces which build up mountain chains, which are shoved up by pressure in a manner analagous to the drawing, at right, showing a piece of paper being crumpled into a ridge by opposing forces.

A few weeks ago an earthquake centering around Long Beach, California, won shocking newspaper headlines. As earthquakes go, it was not of violent intensity, but it did serve to prove a lot of things that scientists have concluded to be true about earthquake-proof structures.

They have known for a long time that an earthquake wrecks a building by moving it in one direction and then suddenly reversing the movement—a "snap the whip" effect so rapid that inertia carries the top of the building in the first direction before it can recover itself to follow the backward motion of the foundation. Walls of ordinary construction can't resist the strain, and down they go.

Skyscrapers Emerge Unscathed

Yet the Los Angeles city court house, 25 stories high, weathered the recent quake undamaged. Large Long Beach buildings, as shown in one of the photos reproduced herewith, weathered the strain intact.

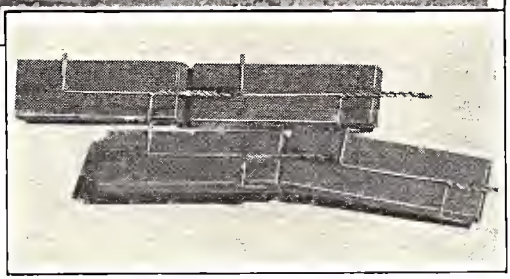
How was that possible? Largely because engineers *designed* them with enough margin of safety, and because they were of such proportions that they had a flexibility of their own. If this seems complicated, consider the fact that a tremor, shaking the foundation of a skyscraper, is absorbed by the swaying steel framework as it travels toward the roof. True, the building may swing and rock, but it will not collapse.

On the other hand, smaller buildings which vibrate in time with the quake—in much the same way that one tuning fork can set its twin in motion—are subject to strains which cannot be absorbed in time.

Many buildings which collapsed, however, did so because of sheer flimsiness of construction. Study the photo of fallen brickwork reproduced with this article. Note that, instead of a bond of cement to hold layers of bricks together, the mortar consisted of little but sand. A crooked contractor skimped on materials, but it took a quake to uncover the poor construction. The first necessity for an earthquake-proof building, therefore, is that it be constructed to specifications of the best materials.

Obviously a home-builder cannot put up a skyscraper for a residence to protect against earthquakes. Fortunately that is unnecessary. His first consideration must be to avoid certain dangerous features of construction.

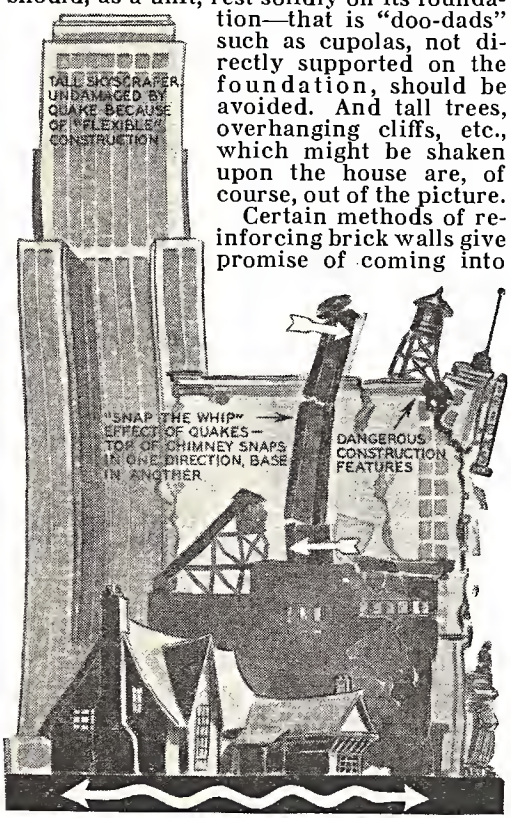
Poor construction inevitably shows up in an earthquake. These bricks, which fell from a Long Beach building, were practically held together by sand, so greatly had the builder skimped on cement. Note air spaces between the bricks.



This wire method for binding bricks into a solid reinforced wall, intended to resist earthquakes, has just been patented.

Foundations should be on solid rock, never on filled spots, on shifting sands, or on soggy, undermined areas. Everything ornate, such as projecting balconies and verandas, should be avoided. Arches are unsafe, easily shaken down. The house should, as a unit, rest solidly on its foundation—that is "doo-dads" such as cupolas, not directly supported on the foundation, should be avoided. And tall trees, overhanging cliffs, etc., which might be shaken upon the house are, of course, out of the picture.

Certain methods of reinforcing brick walls give promise of coming into use. Steel reinforcing rods have long been used in concrete, and the same principle is covered in a patented method pictured in the photo above. Immediately following the late quake, California started drafting new building codes requiring more rigid structures, so the disaster is not without its hopeful side, since the next tremor will not catch California unprepared.


TALL SKYSCRAPER UNDAMAGED BY QUAKE BECAUSE OF "FLEXIBLE" CONSTRUCTION
"SNAP THE WHIP" EFFECT OF QUAKES— TOP OF CHIMNEY SNAPS IN ONE DIRECTION, BASE IN ANOTHER
DANGEROUS CONSTRUCTION FEATURES

Skyscrapers resist quakes because they are flexible, can sway with the shock. Smaller structures act like a snapped whip, the top moving one way while the base moves another.

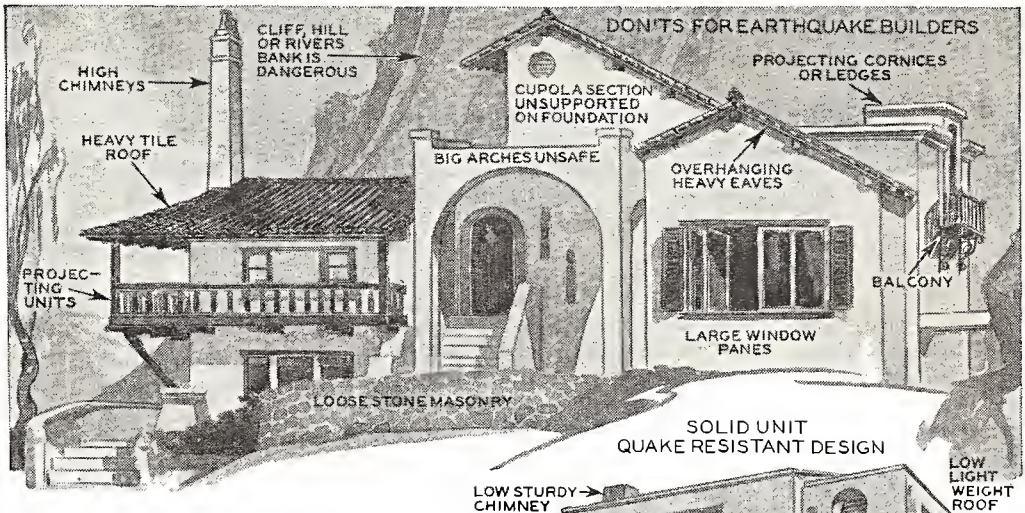
No one has been able yet to devise any means to predict the coming of earthquakes beyond the certainty that in certain regions where faults are common it is safe to say that some day the earth's crust will crack under the strain and produce a temblor.

Queer Behavior of Quakes

Oddly, in Japan the ground sometimes rises nearly three feet a half-hour before an earthquake. Queer things often happen before the arrival of a temblor. Not only does the Japanese earth rise, but it also tilts on an angle. Geysers spurted out of the Salton sea before one earthquake.

The cause of most earthquakes is simply explained. It has been known to seismologists and geologists for many years, and is responsible for most of the 9,000 yearly temblors that keep the earth in practically constant motion. A fault, no more mysterious than a common crack, exists in subsurface rocks. One side is being shoved sideways; when the force overcomes the friction the mass moves and a quake results.

"We may get a better picture of the California shock," said Dr. John Buwalda, chairman of the division of geology and paleontology at the California Institute of Technology, "by understanding its cause.



Practically all the dangerous features which make a building unsafe in earthquake territory are shown above. Not all these features would likely appear in the same building, of course; but each one of them is a source of danger.

Here's a composite residence embodying a design little likely to be damaged by quakes. It should rest on a solid rock foundation, if possible—never on swampy subsoil.

It resulted from a slip on what geologists call a fault. This is a vertical break in the earth's crust extending to depths of 20 or 30 miles and usually continuing for tens or hundreds of miles along the surface.

"The block on one end slips past the other and the loose surfaces give a grating effect which forms waves in the surrounding territory. Understanding the cause enables us to realize that the numerous after shocks following the main earthquake are merely adjustments in the rocks along the fault. They always occur after every sizeable earthquake, they gradually decrease in strength and number and cease altogether after a few days or weeks.

Country Safer After Shocks

"They do not indicate that another shock is likely to occur," the famous geologist continued. "In fact, it is the universal experience with moderate and heavy earthquakes that no heavy shocks follow the original disturbance. The probability of another severe shock in the near future in the area shaken is very remote."

There must have been a terrific noise as the rocks ground against each other, reducing many tons to fine powder while they moved. Six miles down and nearly 20 miles off the southern California coast! What a spectacle to contemplate.

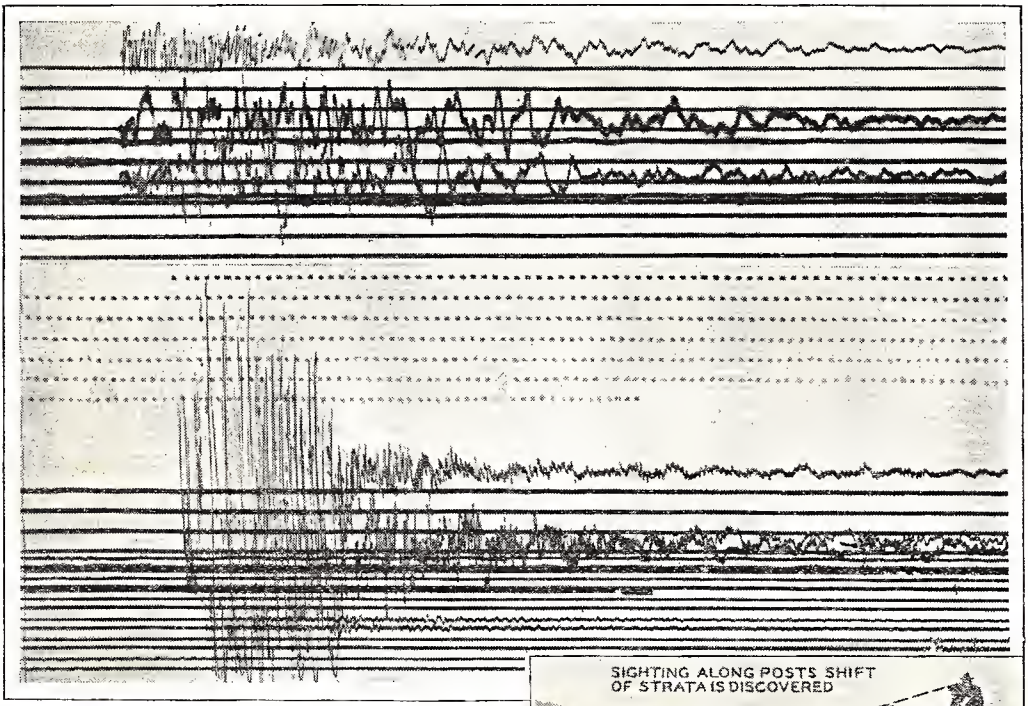
How, you may ask, do the scientists fix the source so definitely? Were all the problems of science so simple the world would have little need of their services.

By the comparatively old method of triangulation, plus a computation of the difference in time required by the subterranean and surface waves to reach the various seismographs stationed in the vicinity, the seismologists can "spot" the source of a quake, often before word of the disturbance becomes known. In China not many months ago seismologists announced a severe temblor in a far-away province several weeks before delayed messages reported the disaster.

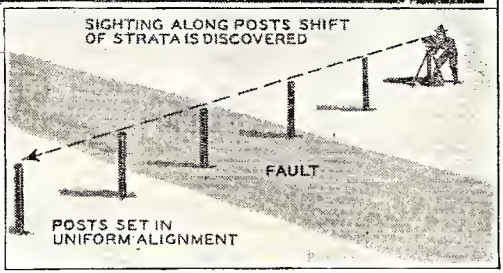
Now suppose you picture a large triangle, each side of which is a hundred miles or so long. At each corner stands a seismograph. This is an instrument that is fixed rigidly to the earth. When the earth shakes, the seismograph shakes. But it does more. If it shakes from south to north, the direction of the movement is noted and an ordinary pen, filled with ink, writes the extent and duration of the movements on a broad sheet of paper. The exact time is also noted.

At each of the other two stations the same observations are made. Then the experts in charge of these stations confer. With a large cross-sectioned sheet of paper before them, they extend the lines from each station out in the direction from which came the shakes. Where those lines cross, there is the epicenter (the spot on the earth directly above the quivering mass) of the earthquake.

California Quake Inscribes Remarkable Record in Own "Handwriting"



Above is the first photo of a seismographic recording of an earthquake taken at the scene ever obtained. Dots in the center represent half-second intervals. Vigorous acceleration shown at lower left corner continued at Long Beach only 8 seconds. Top record, taken at Los Angeles, shows quake had lost half its intensity before reaching that city.



No method of predicting dates of quakes is known, but underground movements can be checked over a period of time by sighting along posts set over suspected area, as illustrated in photo above, detecting any displacement.

But they want to know more. If the crust is not broken, it must have taken place somewhere below, possibly 10 or 20 miles. Again they consult their wavy records. By a computation too complex to detail here they learn the depth through a study of difference in arrival of the waves that come along the surface and those that radiate deep down in the crust.

Earthquakes result from three causes: Submarine explosions, volcanoes erupting, and faulting. Fortunately there is no danger of a tidal wave in the west, for the character of earthquakes around the North American continent is not such as to cause them. Quakes have been known to result from a sudden lifting or dropping of the ocean's floor far at sea to compensate for a similar movement elsewhere. Such a drop has been known to exceed 600 feet.

Uncle Sam can consider himself fortunate. While he has suffered a few earthquakes, some of them with sensational results, the death toll has not been high. Italy, a land of bad earthquakes, suffers an average death loss of 4,000 lives for each temblor of consequence.

Seismographs reveal that the earth is in a constant state of vibration. Somewhere the crust moves constantly, sometimes vertically, sometimes horizontally and occasionally in both directions at once.

Occasional movements of the earth mean that the population in that neighborhood need suffer little alarm over their safety. "There need be no great loss of life or damage to property from earthquakes," said Dr. Bailey Willis, former president of the Seismological Society of America. "If buildings in the Long Beach region had been built as we now know how to build them, the damage would have been slight."

Paradoxical though this may sound, earthquakes often are a blessing in disguise. San Francisco has not been visited by a severe temblor since her upheaval of 1906. The destructive earthquake at Charleston in 1886 shook a large area, but relieved the strain. An earthquake in the Mississippi valley in 1811 and another in the St. Lawrence valley two centuries ago shook areas of enormous size. Yet after each the earth in those regions has stood steady all this time.

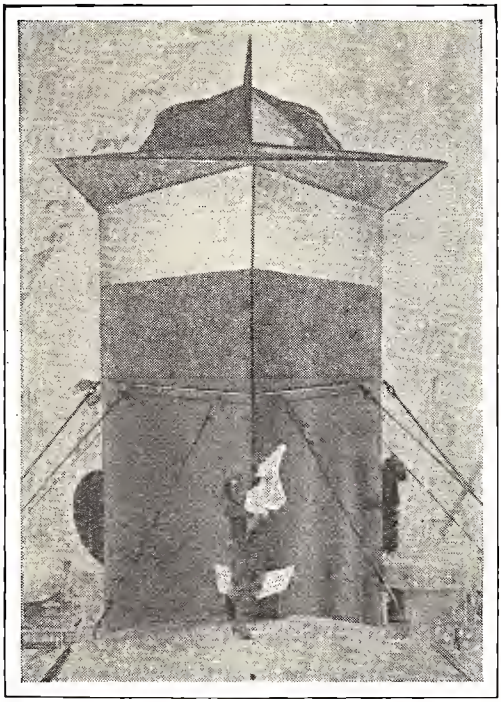
Oddities of SCIENCE

by NIC SPRANK

WHEN YOU BATHE IN THE OCEAN YOU RAISE THE TIDES ALL OVER THE WORLD. (The effect is not measureable, but is theoretically true.) Robert Curran, Camden, N.J.
AIR COMPRESSED AROUND NOSE OF BULLET SHOVES FEATHERWEIGHT EGG-SHELL ASIDE
AN EXPERT MARKSMAN CANNOT HIT AN EMPTY EGG-SHELL, HUNG FROM A YARD-LONG SILK THREAD, AT A DISTANCE OF 50 FEET.— Myrick Tiystett, Lubbock, Texas.
ALGERIA HAS A RIVER OF GENUINE INK. (Formed by junction of two streams, one from region of iron-bearing soil, the other from a peat swamp, latter containing gallic acid. Acid and iron with water form a true ink.) —Charles S. Youngs, Jackson, Mich.
IF YOU COULD FOLD A PIECE OF PAPER 61 TIMES, DOUBLING IT EACH TIME, THE THICKNESS WOULD REACH FROM THE EARTH TO NEPTUNE AND BACK. —Rees Whitlock, Santa Cruz, California
Nic Sprank
LIGHT PRODUCES DARKNESS! (Hold fingers close together, note the dark, parallel lines caused by light waves striking each other and nullifying effect of light.)—Joseph J. Walter, Ames, Iowa.
TREES CANNOT FREEZE IN THE COLDEST WEATHER. (Sap circulation stops and trees stand dormant.) —Chester Harrison, Indianapolis, Ind.

ONE DOLLAR will be paid by Nic Sprank for oddities of science used on this page. Send in your ideas—no limit to the number of suggestions you may make, but be sure to enclose proof of your statements. Maybe your ideas will be better than those shown on this page—if they are, Nic Sprank wants them and will be glad to send you a check. Address suggestions to Nic Sprank, care of Modern Mechanix and Inventions, 529 South Seventh Street, Minneapolis, Minn.

New "Airplane Funnel" Keeps Smoke Clear of Ship's Deck



How the "aeronautical funnel," shaped like tail of an airplane, draws air upward is illustrated by motions of scarf.

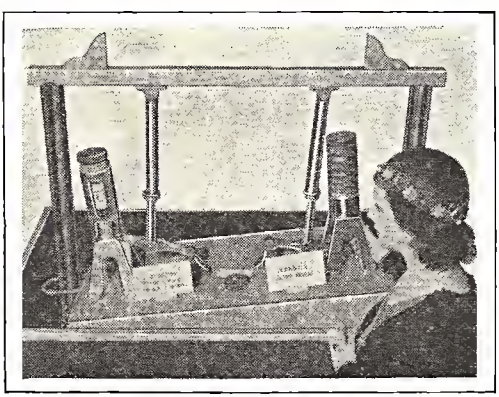
THE principles of airplane designing are now being applied to funnels of ocean greyhounds. A striking case in point is the novel airplane smokestack that is now being used on the new Grace Line ships plying between New York and California.

The design for the funnel was worked out at the New York University after many experiments in an aeronautical wind tunnel. As illustrated in the photo at the left, the airplane tail shape of the stack not only keeps the smoke clear of the ship as it issues from the funnel, but creates an upward air current as indicated by the fluttering scarf which the fair passenger in the photo is holding.

Generates Power From Sea Waves

ONE of the gadgets which attracted the widest attention at the Inventor's Congress held recently in Los Angeles was a wave motor which the inventor claims will utilize the motions of the ocean's surface to generate hundreds of kilowatts of electrical energy.

No constructional or operating details are available, so you can take a look at the photo below and guess as well as we can how the contraption works. Presumably the two piles on the end support the floating platform which follows the motions of the water to operate the motors.

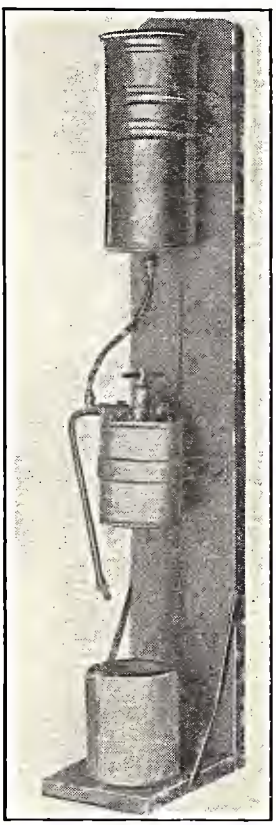


Sea-going motor which takes power from motions of waves.

Filter Recovers Oil for Workshop

A LARGE percentage of cars now have oil filters as regular equipment and run the oil much longer than used to be done, only replacing oil loss occasionally and making a complete change of oil at infrequent intervals.

However, whether it is decided to re-use crankcase oil after filtering or not, such oil is fine for many other things, such as oiling farm machinery, buzz saws and many low speed bearings. For this purpose the filtering unit shown in the illustration has been made up.



Oil fed into top tank, is cleaned by mechanical filter, passing into cup at bottom, as shown in photo.

The oil "tank" at the bottom is made from an old vacuum tank from a junked car. Oil is put into this and runs through a copper tube at the bottom into a mechanical filter also taken from a junked car. From the filter the oil drains into a tin can placed on a bracket. All parts are mounted on a board which may be hung up anywhere, or set on the floor. It will filter about two quarts of heavy oil a day, in warm weather.

It is not generally recommended that used crankcase oil be filtered and used again in an automobile motor.

1000-Car Garage Takes 15-ft. Street Space

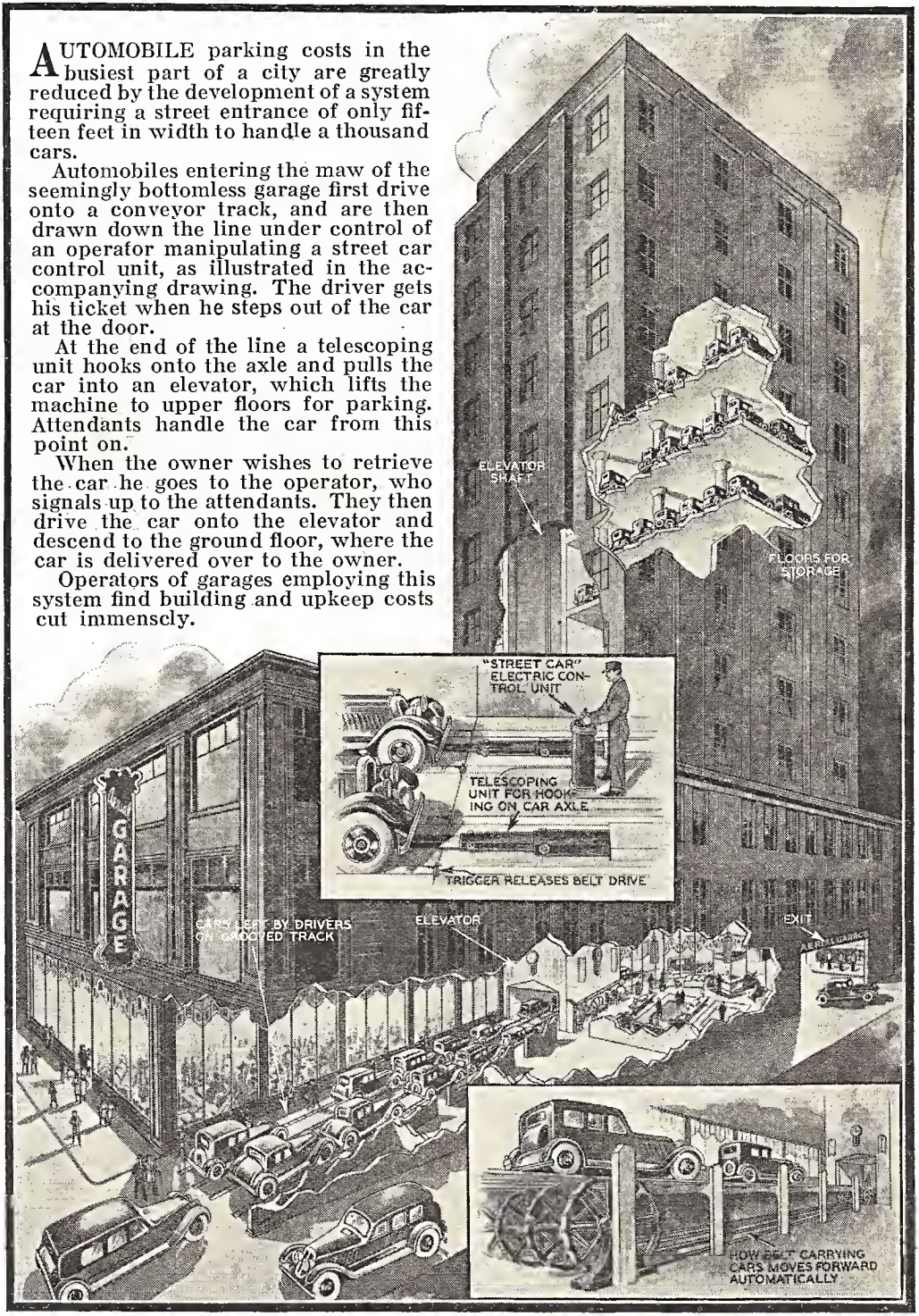
AUTOMOBILE parking costs in the busiest part of a city are greatly reduced by the development of a system requiring a street entrance of only fifteen feet in width to handle a thousand cars.

Automobiles entering the maw of the seemingly bottomless garage first drive onto a conveyor track, and are then drawn down the line under control of an operator manipulating a street car control unit, as illustrated in the accompanying drawing. The driver gets his ticket when he steps out of the car at the door.

At the end of the line a telescoping unit hooks onto the axle and pulls the car into an elevator, which lifts the machine to upper floors for parking. Attendants handle the car from this point on.

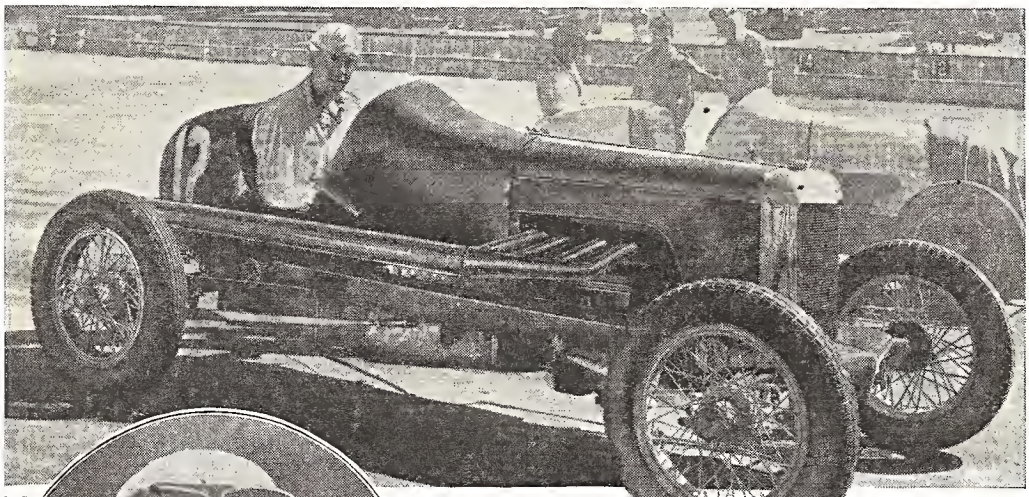
When the owner wishes to retrieve the car he goes to the operator, who signals up to the attendants. They then drive the car onto the elevator and descend to the ground floor, where the car is delivered over to the owner.

Operators of garages employing this system find building and upkeep costs cut immensely.



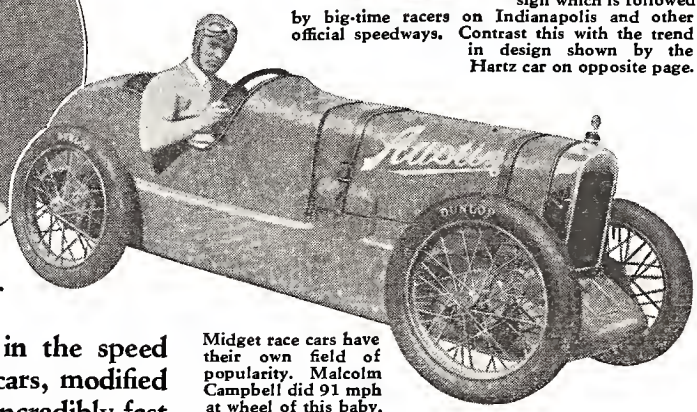
Cars to be parked drive onto conveyor starting at sidewalk. At rear they are drawn onto elevator and lifted to parking floors.

1933 Marvels of the AUTO



Above is the general type of race car design which is followed by big-time racers on Indianapolis and other official speedways. Contrast this with the trend in design shown by the Hartz car on opposite page.

Billy Arnold, an Indianapolis winner.



Midget race cars have their own field of popularity. Malcolm Campbell did 91 mph at wheel of this baby.

Great things are stirring in the speed world! Streamlined race cars, modified stock car speed creations, incredibly fast custom-built racers for assaults against time, are all parts of the changing picture of the most heart-gripping, thrilling sport in the world today—auto racing!

WITH a new automobile speed record of 273 miles an hour recently established by Malcolm Campbell, the internationally famous British speed king, and with several new speed creations along novel lines being groomed for entry in the forthcoming Memorial Day racing classic at Indianapolis, 1933 seems destined to be written down large in speedway history.

Just how extensive has been the influence of such ultra-speed cars as Campbell's *Blue Bird,* Segrave's *Golden Arrow,* and Kaye Don's *Silver Bullet,* can be learned from a study of the pictures which accompany this article. On the opposite page is the latest creation of Harry Hartz, American speed pilot, which he calls *"The Spirit of '76."*

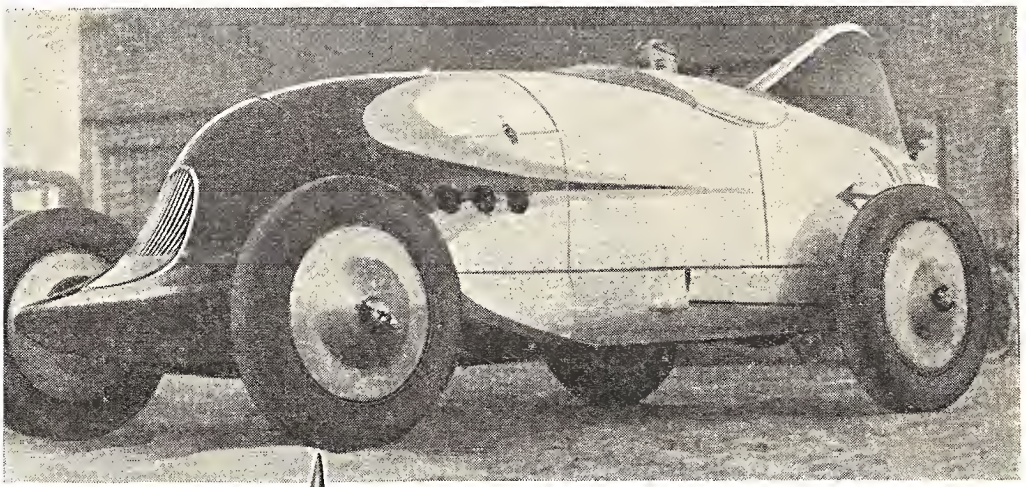
This name derives out of the fact that Hartz is going after Malcolm Campbell's speed record with the intention of restoring the record to American hands. Several well known automotive engineers are behind Hartz in his effort. Trials will be conducted at Muroc Dry Lake in California.

Particular features of *"The Spirit of '76"* are the streamlined body, the small radiator opening, the use of a vertical fin to stabilize steering control, and the top enclosure of half the cockpit opposite the driver to offer as slight air resistance as possible.

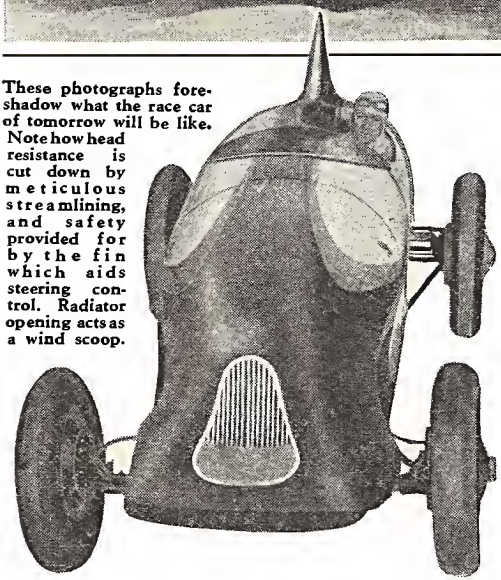
Much smaller in all dimensions than the *Blue Bird,* Hartz believes that his creation has an excellent chance to better Campbell's record because the car is built to do just that one thing. It is much better stream-

SPEED WORLD

by ROBERT M. ROOF and LEW HOLT



Built by Harry Hartz, famous speed pilot, this ultra streamlined racing creation is designed to wrest the world's speed record from Malcolm Campbell, of England, bringing it back to America. Hence the name: "The Spirit of '76."



These photographs foreshadow what the race car of tomorrow will be like. Note how head resistance is cut down by meticulous streamlining, and safety provided for by the fin which aids steering control. Radiator opening acts as a wind scoop.

lined than the *Blue Bird,* and has considerably less weight to push.

Because of its wide departure from A.A.A. specifications for speedway racers, it is unlikely that the Hartz machine will take part in the 500-mile Indianapolis race. But unquestionably it foreshadows the trend of race car development.

Three Types of Racing

Auto racing as it now stands falls into three general classes—races of custom-built superspeed cars against time (such as Campbell's *Blue Bird,* which develops such terrific speeds that it would be suicidal to race a companion car simultaneously on the same track); races such as the Memorial Day classic, on speedways whose car specifications are rigidly specified by racing associations; and dirt track racing—likewise controlled, to a certain degree, by associations, but allowing much more latitude to the individual driver.

In this latter field modified stock car racing is at present enjoying much popularity. Usually the races are run on a percentage basis, 40% of the gate receipts being appropriated as prizes. Stock car racing gives the amateur driver a chance to demonstrate his ability, and it is from these races that owners of high-priced racing cars pick the drivers to pilot their machines on the big-time speedways.

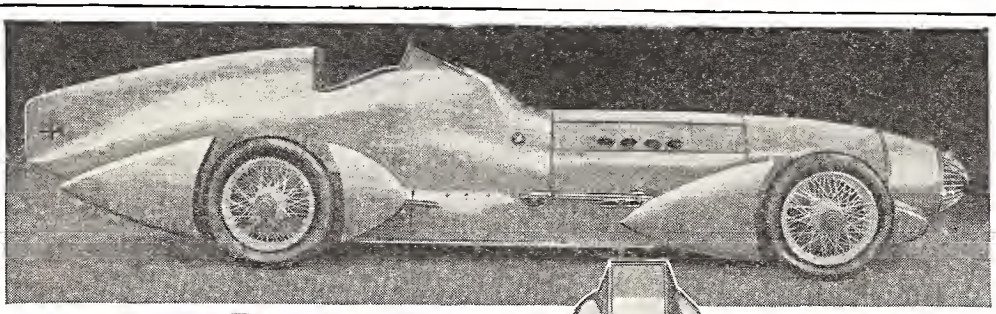
Modified Stock Car Races

Are modified stock cars *fast?* They most decidedly are. At Funk's Motor Speedway, Winchester, Indiana, the fastest half-mile dirt track in the country, a Model A 1929 Ford turned one lap just under 26 seconds. Plenty of big time race cars can't turn in as flashy a performance on the same track.

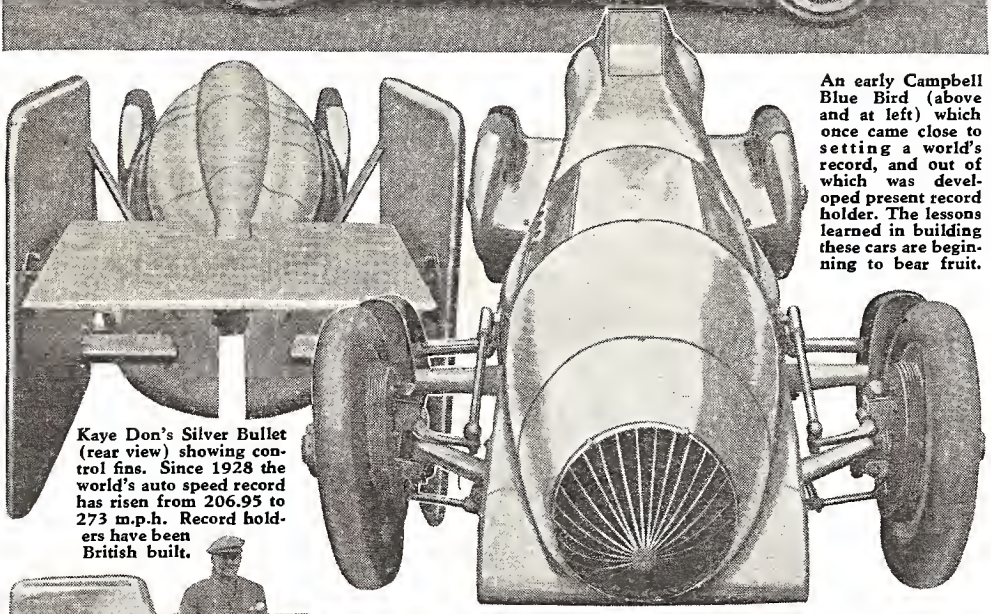
Certain well known machines are specially suited for modified stock car racing: Fords (Models A, T, and V8), four and six-cylinder Chevrolets, Plymouths, DeSotos, and Studebakers. Pontiacs also are adaptable.

Since this type of race gives the amateur his best chance, requiring nothing very expensive in the way of equipment, a few details will be given. On the morning of the race day stock cars must qualify for their positions in the race. Usually the ten fastest cars are allowed in the main event, the slower ones in a consolation race which gives them a chance to win some money to defray traveling expenses.

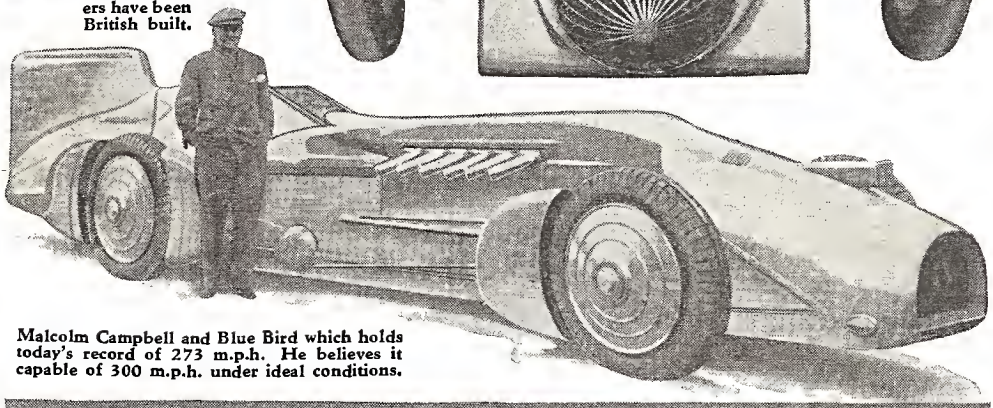
Two 10-mile sprints and a 20 or 30-mile feature race usually comprise the program,



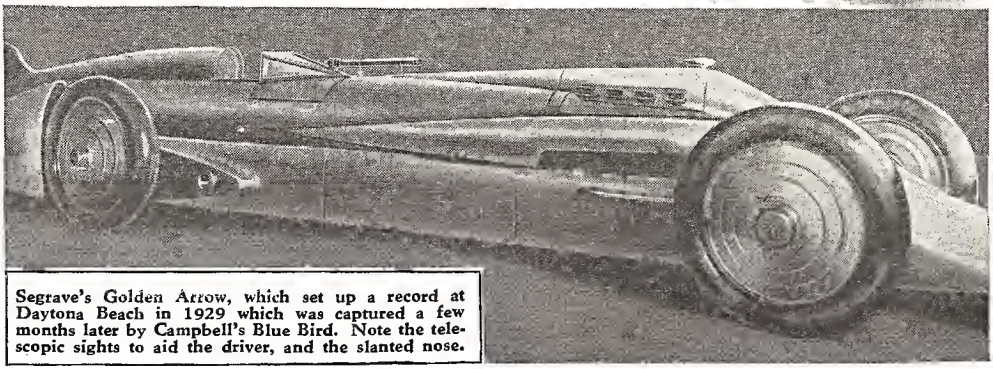
An early Campbell Blue Bird (above and at left) which once came close to setting a world's record, and out of which was developed present record holder. The lessons learned in building these cars are beginning to bear fruit.



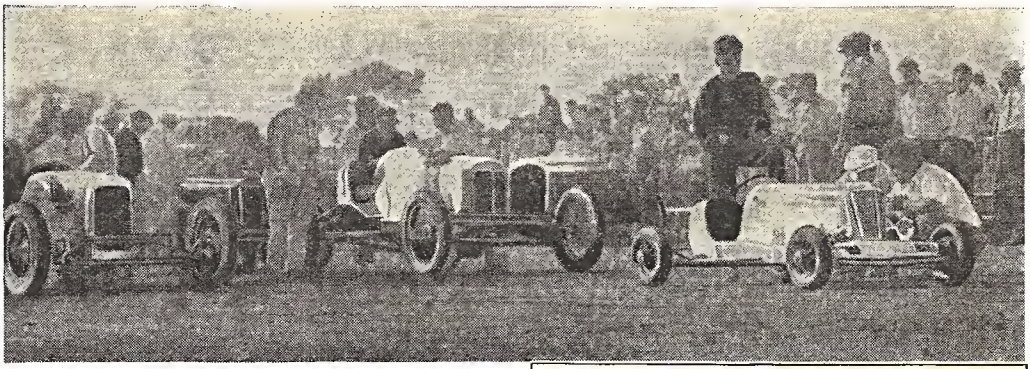
Kaye Don's Silver Bullet (rear view) showing control fins. Since 1928 the world's auto speed record has risen from 206.95 to 273 m.p.h. Record holders have been British built.



Malcolm Campbell and Blue Bird which holds today's record of 273 m.p.h. He believes it capable of 300 m.p.h. under ideal conditions.



Segrave's Golden Arrow, which set up a record at Daytona Beach in 1929 which was captured a few months later by Campbell's Blue Bird. Note the telescopic sights to aid the driver, and the slanted nose.



Lining up for the start of a modified stock car race. The midget Silver Bullet, built by Borntraeger and described in a previous issue of this magazine, leads the big fellows around the track as pacemaker.

with a stunt such as a blindfold race occasionally added. In the latter the driver has a black hood completely covering his head, and he steers his race car entirely by sense of feel—that is, he is so familiar with the race track layout, and can sense position so accurately from the banked turns, that vision is unnecessary. When two blindfold drivers start tearing around the track at the same time, the roaring crowd realizes that it's looking on a real thrill treat.

A white flag is used to start the regular race. The green flag means the driver is starting the last lap, and the checkered flag is the one the boys all hope for, signifying a winner.

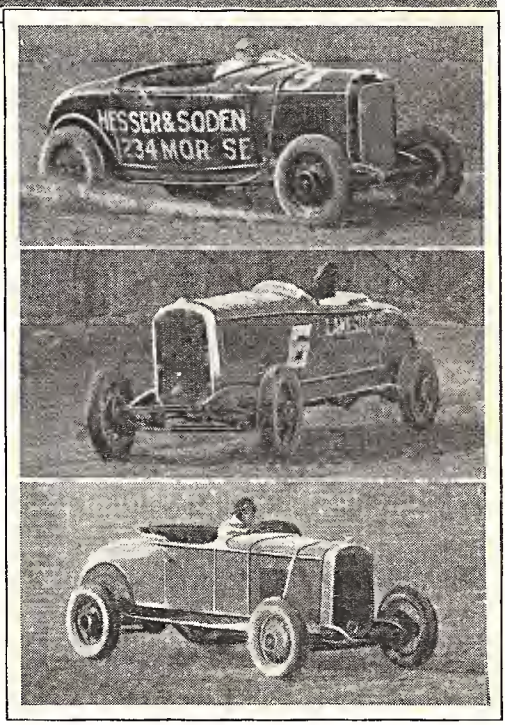
Conduct of Dirt Track Races

When starting a race the drivers are lined up in the order they qualified for. The fastest qualifying car is the pole car, which leads the pack around the track until they are lined up for a flying start. The first lap is the most dangerous, as each driver strives to get into the turn first. After this lap they scatter out and the nerve tension of the drivers is somewhat relaxed.

In modifying stock cars for racing, all fenders, headlights, windshields, tops, and other parts that would cause resistance are removed. Beyond this, procedure varies with each model car. Valve ports of the engine are usually bored out, special valves and aluminum racing pistons installed, high compression obtained through use of special heads, and downdraft carburetor and oversize manifold added.

Ignition systems usually require some changes. Every driver knows that the magneto system is faster than the usual battery type. A special racing coil, which has a double winding with 30,000 turns, is usually used in conjunction with the double-breaker Mallory distributor. This combination generates a very hot and fast spark which requires a special metric racing spark plug to withstand it.

Special fuels are, of course, required to get the most out of the cars. High test gasoline would burn up the valves, so a special dope is added to regular gas.

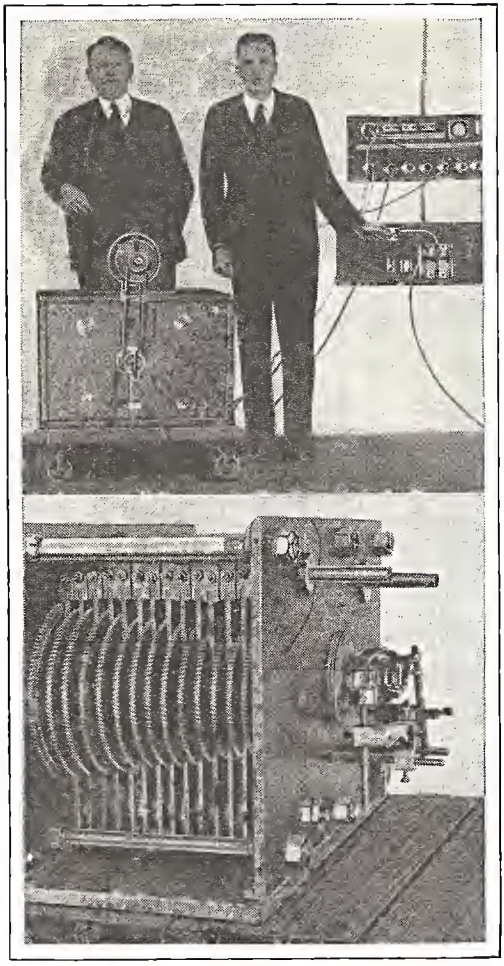


In these three pictures we have Ford, Plymouth, and Chevrolet modified stock cars giving good accounts of themselves. The driver in the middle photo is blindfolded in a stunt thriller. Cars are stripped to reduce resistance.

Modified stock car racing has penetrated to all parts of the world. The Grand Prix Race at Stockholm, Sweden, traveling over mountains, frozen lakes, and dangerous passages, is run with stock cars. Even in far away Madagascar, an island off the coast of Africa in the Indian Ocean, modified stock car races are held.

Editor's note: Mr. Roof is chief engineer of the R & R Manufacturing Company, Anderson, Indiana, manufacturers of parts for dirt track racers.

Electric Eye Solves Baffling Mathematical Problems



Above is seen the amazing "congruence machine" which determines prime numbers. Heart of the machine is an electric eye which registers light coming through wheel holes.

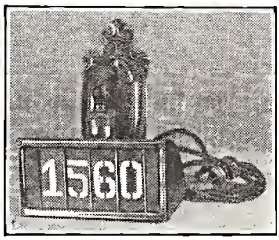
THROUGH the use of a photo-electric cell harnessed to complicated series of steel gears of different radii, Dr. Norman Lehmer, professor of Mathematics at the University of Southern California, has succeeded in solving certain problems that have baffled mathematicians for centuries.

The new "Congruence Machine," as the contraption is called, deals with prime numbers running up into the thirty figure sizes. In a test, the number 1,537,228,672,093,301,419 was handed out for dissection, and in three seconds the machine indicated two prime factors, 529,510,939, and 2,903,110,321, which proved to be correct.

The end view shows series of gears with holes under each cog. Light from prisms is reflected through these holes into a photo cell to set the calculating mechanism in motion.

House Numbers do Duty 24 Hours

A COMBINATION porch light and illuminated house number now on the market makes it easy for a visitor to locate your home at night. Slots for five interchangeable numbers are provided, as shown at right.



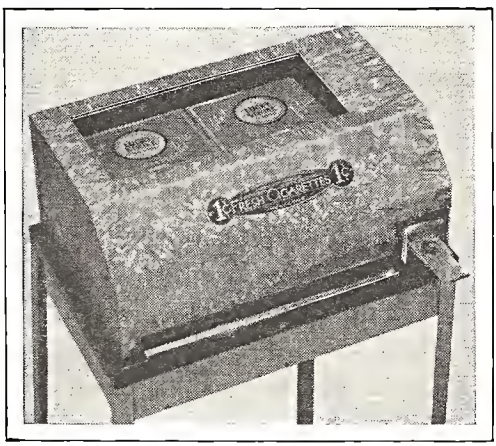
Porch light shining through the figures shows house number to passers-by a hundred feet away.

Repair for Broken Jig-saw Blades

Extension occupies broken section of blade as illustrated here.

A JIG-SAW accessory now on the market doubles and triples the life of blades. The device is an extension which attaches to the end of the broken blade to fill it out to normal length, as illustrated at the left. The upper end of the gadget hooks into socket otherwise occupied by the end of the blade.

Machine Vends Single Cigarettes



Complying with law in every respect, this machine delivers single cigarette from flat tin of fifty inside the cabinet.

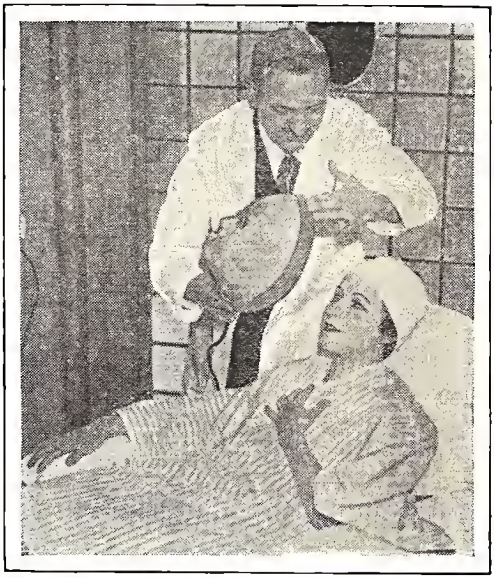
AN EASILY operated vending machine which sells one cigarette at a time and yet complies with the laws has been marketed for use in public places. The fags are sold directly from the flat tins of fifty, and are made accessible to the buyer by the insertion of a penny in a slot.

Electric Mask Removes Lines and Sags From Milady's Face

BEAUTY may be spiritual, but it seems to thrive best on mechanical aids.

Proof of this may be found in an electric face moulding mask recently introduced by Dr. Joseph Brueck, Viennese and New York beauty specialist. In the mask is embedded a battery of heating coils which generate a warmth that quickly banishes lines, wrinkles and sags from milady's face whether they be due to age, illness or hard work.

While milady is being made beautiful, she breathes through a tube set between the lips of the mask, and views the world through eyes cut where eyes should be.



Dr. Joseph Brueck, Viennese specialist, applying mask which removes all lines, wrinkles or sags from milady's face.

Dam May Warm Cold East Siberia

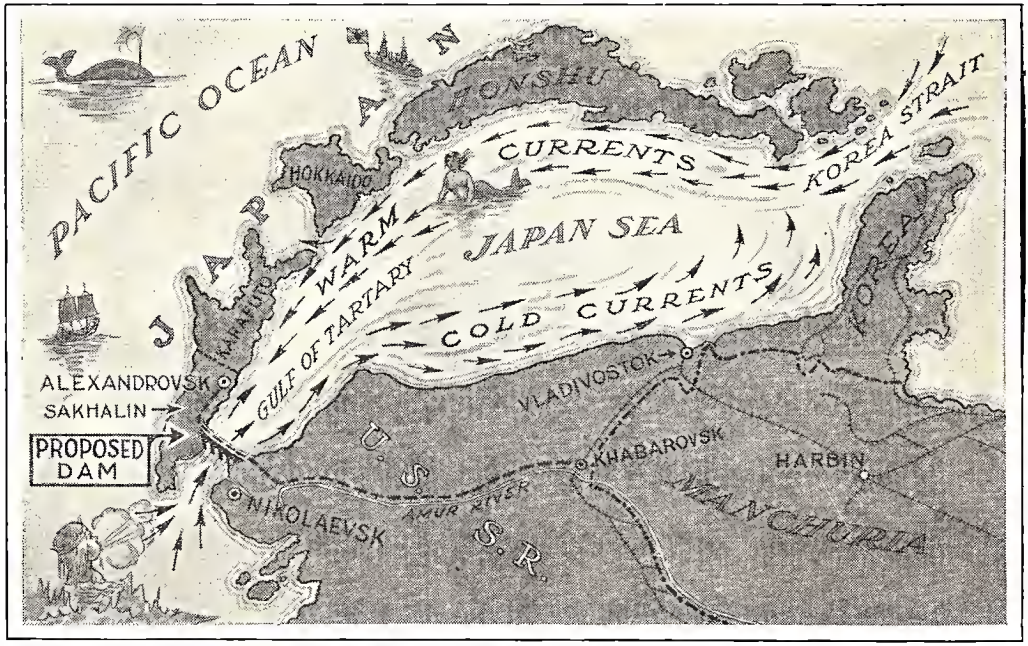
THE forbidding arctic wastes of southeastern Siberia and northeastern Manchuria may soon be converted into fertile farmlands blessed with a temperate climate, if the Gulf of Tartary project designed by Soviet engineers is brought to completion.

The project calls for the construction of a gigantic dam between the mainland and Karafuto Island. A dam at this point, engineers believe, will divert the frigid waters of the sea of Okhotsk from the gulf of Tartary and thus relieve eastern Russia of the intense cold created by the currents flowing down the coast.

With the cold currents cut off by the dam, the warm waters from the Korean strait will flow instead, bringing milder temperatures and thus permitting cultivation of the region.

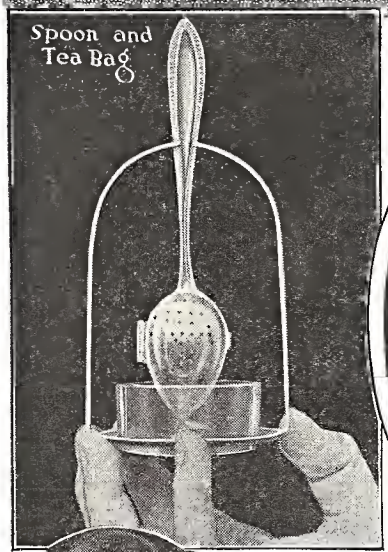
Makes World's Most Foolish Bet

TO a Philadelphian goes the prize for making the world's most foolish bet. He laid a wager with companions that he could chew up a big Fourth of July torpedo. While trying to win the bet, however, the explosion tore his cheeks loose, drove the roof of his mouth into his nose, killing him.

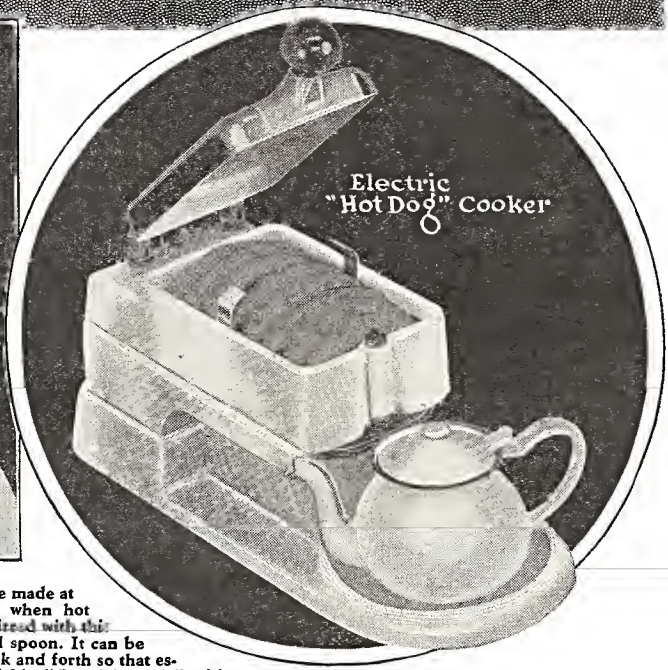


Erection of a dam at the point indicated on this map will, Soviet engineers believe, divert cold currents from Gulf of Tartary and lower average temperatures of region adjoining. Mild climate will prevail, opening areas to cultivation.

Latest Mechanical AIDS



Tea may be made at top speed when hot water is stirred with this perforated spoon. It can be swung back and forth so that essence is quickly diffused through liquid.



Wieners placed in receptacle of this electric cooker act as their own heating element. Ends of the "dogs" are placed in trays and salt water is then poured in. Closing the top of the cooker shoots juice through the meat.

Tea is brewed automatically, without any attention whatever, by this new household gadget. You fill the kettle with water, and place it on the gas stove. When the water boils, it overflows into the teapot, and when the tea has brewed long enough, the bell rings, calling you to your beverage.

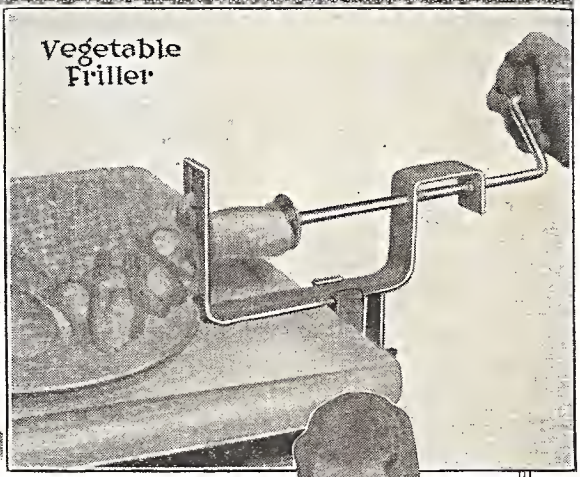
These new decorative jars are at home either on the dining table or on milady's dressing table. When jar is to be converted into a tumbler, the top is removed and the bottom is screwed onto a base piece, as illustrated. You can secure addresses of manufacturers of any of these household aids by writing to Modern Mechanix and Inventions Aid Editor, 529 So. Seventh St., Minneapolis, Minn.

for the Busy HOUSEWIFE

Dog Couch

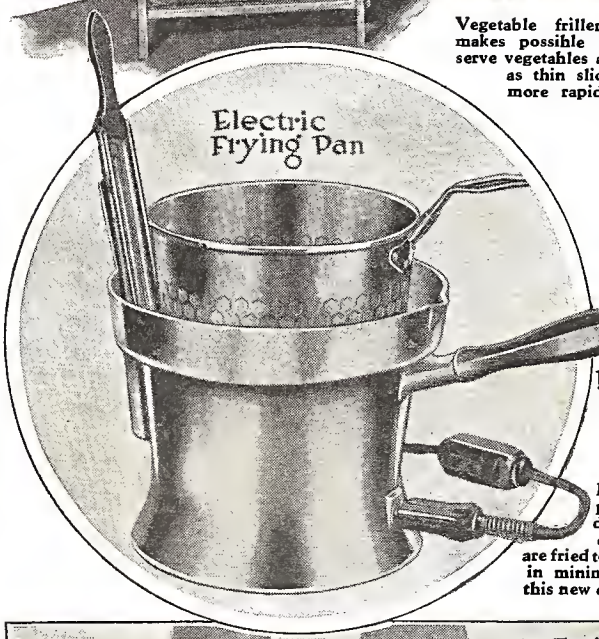
This couch, especially designed for your pet pooch, keeps him off davenport, where he is not wanted.

Vegetable Friller



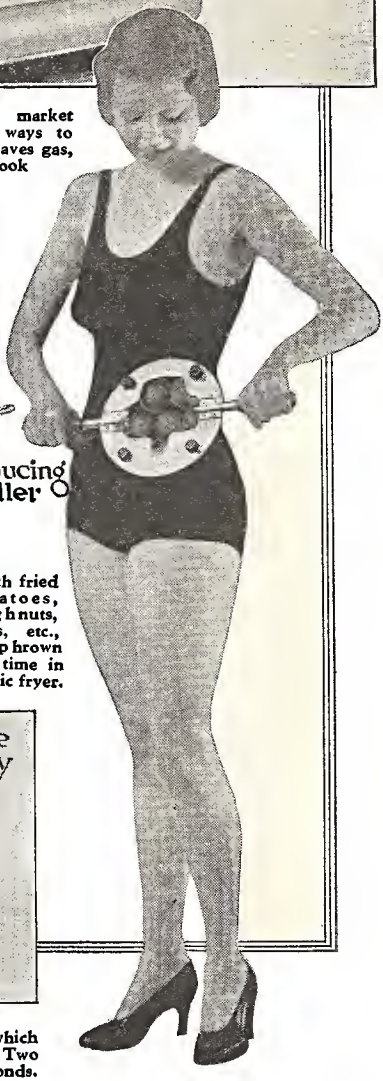
Vegetable friller on market makes possible new ways to serve vegetables and saves gas, as thin slices cook more rapidly.

Electric Frying Pan

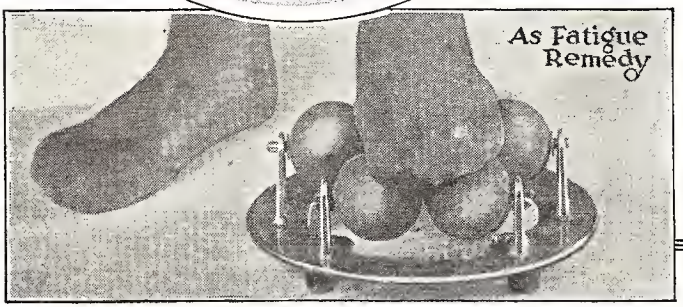


French fried potatoes, doughnuts, chops, etc., are fried to deep brown in minimum time in this new electric fryer.

Reducing Roller



As Fatigue Remedy



Excess fat is removed and tired feet are relieved by this massaging device, which consists of six hard rubber balls attached to a light aluminum frame. Two detachable handles are provided, which may be fitted on in a few seconds.

Things that AREN'T TRUE

Top left, breaking front strangle hold; right above, breaking back strangle hold. At left, methods of approaching drowning persons are pictured. All methods described fully in this article. Photos courtesy of American Red Cross.

TWO hundred yards from shore a swimmer gracefully cavorts in the water off a nationally known bathing beach. His strong, steady strokes excite the envy of less gifted bathers. But all at once something happens to our ambitious swimmer. He's crying for help and his arms helplessly thresh the water.

Noticing our hero's plight a rescuer makes his way to the swimmer's side. But the drowning man gets a strangle hold on him. Whereupon the rescuer "busts" the victim on the jaw, and then, when the latter is unconscious, transports him safely to the shore.

This sort of thing makes good reading.

Breaking two drowning persons apart. Swim behind one of them, place hands on chin. Push down with forearms to sink victims, raise one foot over your locked arms, placing foot against chest of subject facing you. Straighten your leg, push down and pull up, separating the two struggling victims. Carry one to safety, then return for the other.

About Drowning

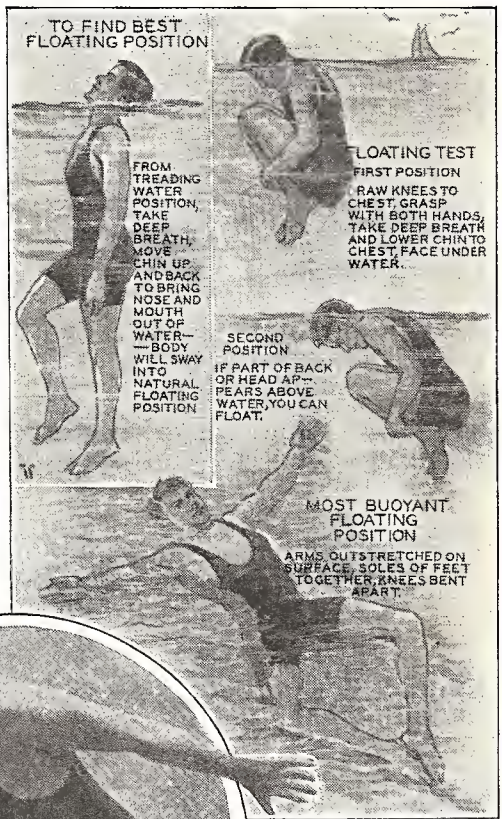
by Commodore Wilbert E. Longfellow
Asst. Director, Red Cross Lifesaving Service

The nation's No. 1 expert on methods of saving the lives of drowning persons explains here the technique used by the American Red Cross Life-Saving Service, of which he was the very first member and is now assistant director. You'll likely be surprised at the commonly accepted theories about drowning which he "knocks into a cocked hat."

It's a familiar yarn to most of us. I'm using the incident only because it strikingly illustrates one of the commonest popular fallacies about saving the lives of drowning people—namely, that you ought to "bust" a drowning man on the jaw to render him unconscious, granted that he gets violent and achieves a strangle hold on you.

There are almost countless other silly notions about life-saving that ought to be cleared up. But I'll take time to mention only the outstanding ones.

Taking up fallacy number one—about "busting" a drowning man in the jaw—there was a time not so long ago when this procedure was utilized rather widely. But a qualified life-saver today would be hooted out of the profession if it became known that he favored this brutal system. It's well nigh impossible,


TO FIND BEST FLOATING POSITION
FROM TREADING WATER POSITION, TAKE DEEP BREATH, MOVE CHIN UP AND BACK TO BRING NOSE AND MOUTH OUT OF WATER—BODY WILL SWAY INTO NATURAL FLOATING POSITION
FLOATING TEST
FIRST POSITION
DRAW KNEES TO CHEST, GRASP WITH BOTH HANDS, TAKE DEEP BREATH AND LOWER CHIN TO CHEST, FACE UNDER WATER.
SECOND POSITION
IF PART OF BACK OR HEAD APPEARS ABOVE WATER, YOU CAN FLOAT.
MOST BUOYANT FLOATING POSITION
ARMS OUTSTRETCHED ON SURFACE, SOLES OF FEET TOGETHER, KNEES BENT APART.

Above, tests for floating ability and means of securing maximum buoyancy. Commodore Longfellow is shown in the circle at left. As the leading technician on lifesaving methods, he is known familiarly as "The Grand Old Man of American Lifesaving."

How to break double grip on one wrist. Put free right hand (or left, as case may be) on subject's right, thumb on top and fingers under. Foot is used to push on opposite shoulder as the arm is pulled toward you, retaining hold on wrist. Shove against subject's armpit with foot which is brought over arms. Straightening leg and pulling arm gives force to break hold.

Standard "Carries" for Drowning Victims—Head Is Kept Out of Water

HAIR CARRY — From position back of subject, grasp handful of hair. With your hand in the position shown in photo he won't roll over. Swim on your side with side-arm pull and scissors kick. Keep your holding arm straight.

HEAD CARRY — At left. Tilt subject's head backward, swim on back, using frog or scissors kick. Rescuer should be in half sitting position, arms straight, head almost vertical, chin on chest, upper body at 45° angle, legs parallel to surface and 3 ft. below it.

TIRED SWIMMER'S CARRY—At right. This is to be used only for getting a tired swimmer to shore, and never with a struggling, frightened one. The swimmer places his arms on rescuer's shoulder, as shown, who pushes him toward shore, using the breast stroke. Either the frog or the scissors kick can be used in this "carry."

anyway, to strike an effective blow under such conditions.

Fallacy number two assumes that if you see a person drowning the first thing you should do is to dive in after him. On the contrary, you shouldn't dive except as a last resort. A good rule to follow is one that Red Cross authorities have advised in their slogan: Row—use a boat if available; Throw—a life buoy if no boat is available; Go—yourself when equipment is not at hand; Tow—to safety by one of the standard carries.

One of the silliest popular notions—fallacy number three—holds that a person struggling for his life in the water comes up three times before drowning. The truth is that he may come up many times, or not at all, depending on various conditions.

Another fact that may be news to many people is that some persons are "drowned" without any water whatsoever being found in their lungs. What happens in this connection is very simple—the victim swallows a small amount of water down the wrong way and this results in a spasm of the throat, and the person actually dies from rebreathing his own unexpired gas.

Again and again we hear about fallacy number four, which says that the rescuer, if there's no expert help at hand, should roll an unconscious swimmer on a barrel in order to revive him. The fact is that Red Cross authorities, after careful examination of this system over a long period of years, have definitely concluded that the barrel roll, formerly extremely popular, is old fashioned, well nigh valueless and even dangerous.

Fallacy number five claims that a man is drowning if he throws up his hands. Utter foolishness. For throwing up the hands is not an indication of drowning but a cause. Few men can float with one arm in the air, let alone with two.

Most people seem to be firm believers in the fallacy number six—to the effect that women are more liable to drown than men. The real truth is, they are far less liable. Generally speaking, women are far more conservative in their water maneuvers than are men.

"Good" Swimmers and "Safe" Swimmers

Right along the same general line of fallacies is number seven, claiming that the "good" swimmer is usually a safe swimmer. Not necessarily. Depends on what you mean by the term, "good." Too many people seem to think a few fancy dives mean expert water knowledge, whereas the truth is the flashy diver may know just enough swimming to get back to the diving ladder. Then again, many "one-stroke" swimmers are inclined to be overly cocksure, because they can do a 20-yard crawl in peppy style.

Number eight on our fallacy list says that a comparatively small man, who is not an especially good swimmer, can't be expected to save a big, husky chap who's drowning. Fortunately this is not true. Your little man, granted that he maintains a cool head, can do an excellent job of saving the life of the bigger chap, if he'll simply utilize the "hair carry" method, which I'll describe later on.

"If you can't swim and you suddenly find yourself in deep water, without help at hand, you'll surely drown." So goes fallacy number nine. But don't you believe it. Here's the idea: if you find yourself in deep water the chances are it's from one of two reasons—either you've fallen off a boat, or your canoe capsized. In either case even the water-filled craft will support you almost indefinitely.

The Test for Floating

Then there's the matter of floating. It's been estimated that about 98 per cent of people can float. Here's the correct procedure to discover whether you belong to this 98 per cent: try it in your favorite swimming pool, first of all in shallow water: draw knees up to chest, grasping them with both hands. Take a deep breath and lower chin to chest, face under water. If you remain entirely submerged, then you

(Continued on page 27)

Fallacies About Drowning

The idea that a drowning man should be struck on the jaw to break a hold is descredited by lifesavers. For one thing, it's nearly impossible to strike a stunning blow in the water.

Diving after a drowning victim is the mark of an amateur. Get a boat or throw a float—dive only as a last resort.

"They come up three times before drowning." Maybe—and maybe not. A drowning person may not come up at all. It all depends on conditions.

Rolling a victim on a barrel does no good—it's more likely to prove harmful.

"Men are less likely to drown than women." Wrong — women are more conservative swimmers, less likely to get into difficulties.

"A small man, not an especially good swimmer, can't rescue a big fellow from drowning." A 100% error—if he keeps a cool head, uses hair carry method, the small chap can do a first rate job of rescuing.

And don't lend an ear to the dangerous fallacy that you can remove fear of water from a beginning swimmer by throwing him overboard. More likely you'll instill a deeper fear which will prevent his ever learning to swim.

Knowledge of the prone pressure method of artificial respiration has revived many drowning victims. Note position of head and arms of the victim. The method should be practiced ready for an emergency. Be sure it is needed before administering it; it is required only when the victim is unable to breathe. If unconscious but breathing, he requires treatment for fainting or shock.

Sitting Is Painless After a Jaunt in This Horseback Chair

Equestrian novices feel no painful after-effects from a jaunt in this easy chair mounted astraddle Dobbin's back.

THE after-effects of that first ride on horseback usually are anything but agreeable. A veteran trailsman of Alberta, Canada, however, has come to the rescue of sorely beset equestrian novices and has devised a chair which makes sitting easy. The remedy, shown at the left, is an easy chair mounted saddle fashion on old Dobbin's back.

Here's How We Spend Our Lives

AN EXACT diary kept by a German octogenarian shows about how most of us spend our lives. According to the record this German spent about one-third of his time in sleep. Work claimed 26.6 per cent of his waking hours, while eating and drinking took up 7.5 per cent. Making love absorbed 5.1 per cent, while shaving, getting a haircut and combing locks used up eight-tenths of one per cent. A fraction of one per cent of his lifetime was used in yawning, hunting lost collar buttons, laughing and polishing eye glasses.

Aluminum Canoe Weighs 35 lbs., Adds 1/3 Speed

A SEVEN-LEAGUE stride in the canoe building art has been made with the invention of an aluminum craft which weighs but 35 lbs. Shown in the photo at the right, the canoe is eighteen feet in length and is the last word in sturdiness. The designer, Frank E. Deer, of Los Angeles, claims that the speed of the boat is increased 30 per cent because of the reduced skin resistance. A 700-lb. load can be carried without the slightest strain, while a 1000-lb. load shows no noticeable effects. The labor of portages is cut to an inreducible minimum.

Lightness of this aluminum canoe is illustrated here. Its weight is 35 pounds; floats 1000 pounds.

Heat Pad Worn on Neck Prevents Driver's Fatigue

DRIVER'S fatigue, caused by the monotony of driving and responsible for many smash-ups on the highways, may be prevented by a new invention called a "sleep arrester," displayed at the recent inventors' congress in Los Angeles. The device consists essentially of a heat coil which fastens to the back of the neck, the object being to supply heat to the nerve centers to the base of the skull. This speeds up blood circulation to the brain and keeps the driver always wide awake. The heat coils are embedded in a warming pad worn as illustrated in the photo. Juice is supplied from the storage battery.

Current drain is very small, and the pad comes in extremely handy as a source of welcome warmth in chilly winter weather.

Heating pad to speed up circulation to brain and thus prevent fatigue is worn around driver's neck as shown here.

Rubber Swim Suit May Be Inflated for Lazy Floating

YOU need have no fear of deep water when you're wearing a new bathing suit shown in the photo at the right. Ideal for youngsters and those who have not acquired proficiency at swimming, the new suit is made of rubber and is equipped with compartments which may be filled with air.

How these compartments are inflated is illustrated in the photo. Before taking to the deep water you can blow yourself up and float lazily on the water without the slightest fear of sinking.

Blowing on hose inflates this new rubber swimming suit.

Indian Is World's Oldest Human

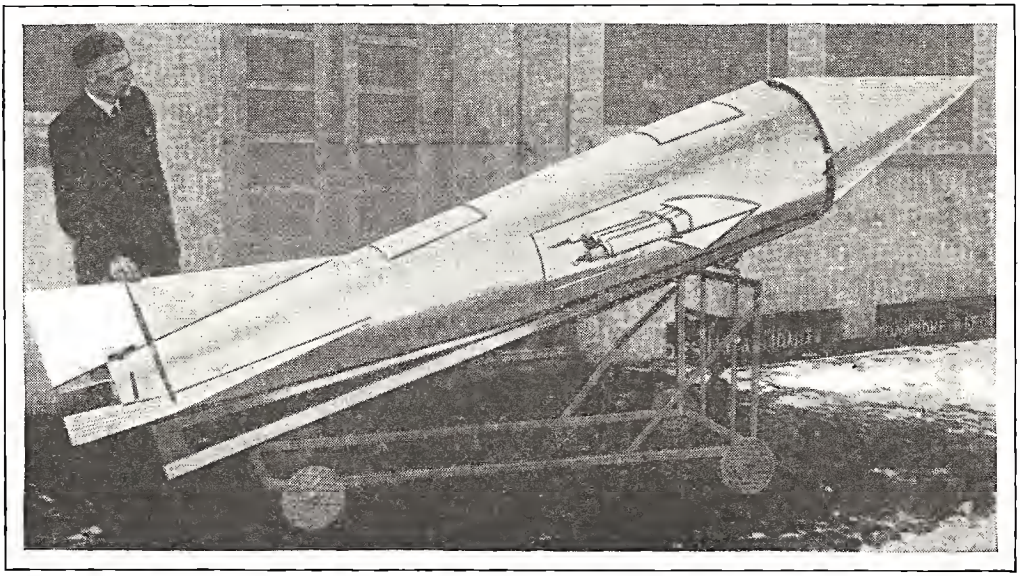
A NEW candidate for the title of the oldest person in the world has been approved by the Census Commission for the Central Provinces of India, whose report has been published in Bombay. This individual is a man named Siddi Wastad of Nagpur, who claims to be 150 but has been able to persuade the census authorities to approve only an approximate 130. Even 130 years constitutes, however, a greater age than any of which there is unquestionable scientific evidence. Until 15 years ago Siddi Wastad is said to have been in good health, but he now is bedridden.

New Stratosphere Rocket Will Soar 600 m.p.h. to Height of 15 Miles

THE recent invention of a rocket that will soar to a height of 15 miles brings the era of stratosphere navigation a day closer.

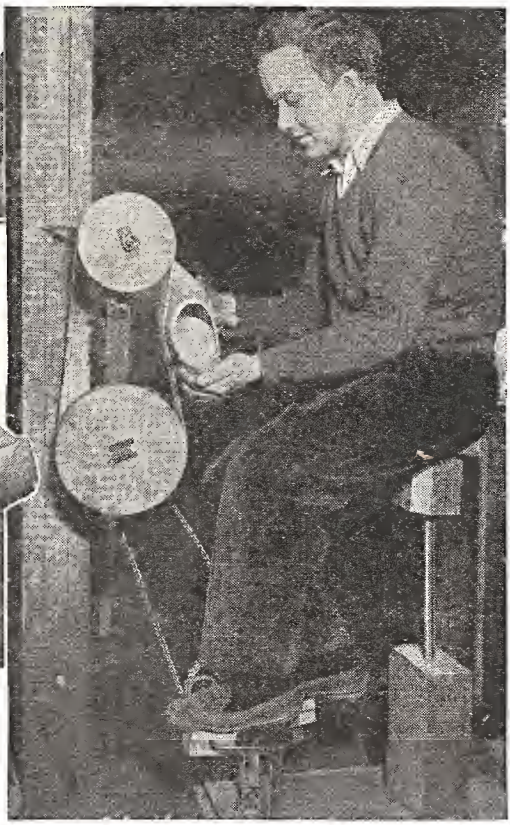
The designer of the new rocket, Heinrich Zucker, of Berlin, claims that his new creation will make possible the recording of atmospheric conditions at heights never before attainable by man.

Shown below, the rocket is powered by twelve subsidiary driving rockets which give a speed of about 600 miles per hour. Body of the projectile is 16 feet in length and weighs about 220 pounds.



Latest in stratospheric projectiles is the German rocket shown above, which, its inventor claims, can soar to an altitude of 15 miles, where it attains a speed of 600 miles per hour. Twelve driving rockets propel the 220 lb. body.

Wooden shoes, carved out of poplar, not only find a ready sale as novelties, but for actual wear among farmers, dairy workers, and other occupations hard on leather shoes.



Joseph Witte in his shop, turning out wooden shoes which he has developed into a depression business. Note home-made sander shown in use at right, sanding belt being driven by wooden wheels attached to bicycle chain and sprocket.

Making Wooden Shoes

When Joseph Witte of Portland, Oregon, found himself among the unemployed, he hit upon the idea of making wooden shoes. At first he made a few pair to sell as novelties, but he was surprised to find that a considerable number of people bought them to wear! Dairymen, farmers, and others compelled to work on wet cement floors or in other occupations where ordinary footgear is insufficiently protective or wears out too rapidly, found the wooden shoes ideal for their purposes.

Mr. Witte sells his shoes at 75 cents a pair and has all the business he can handle. Poplar wood is used. The shoes are first blocked out roughly, gouged out with a chisel, and finished off on a sanding device made from an old bicycle chain and sprocket. The photo reproduced above shows construction of the sander in such detail as is necessary to build one like it. The business is simple enough so that anyone with a few tools can operate it in a home workshop. A little practice is of course necessary, but the shoes fit loosely so that accuracy of size is unimportant. Study of a sample pair of shoes is recommended before starting manufacture.

Replating of Instruments

A Pennsylvania man calls upon doctors and dentists and collects instruments which need replating. When he has gathered a number of instruments he takes them to a plater, who allows him quantity discount prices, has the work done, and returns them to the surgeon, making a profit of from 15 cents to a dollar on each piece. He also collects showcase rims, parts of scales, etc., for replating, from grocers and druggists. Replating of surgical instruments is necessary at intervals to provide smooth surfaces for sterilization.

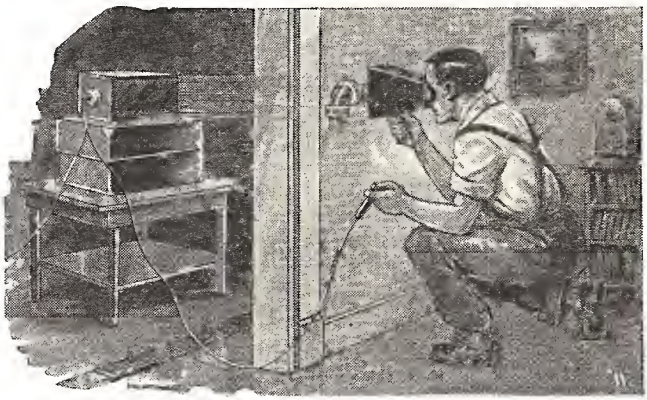
Country Rest Cure

A Chicago broker, out of employment, conceived the idea of renting a costly country place for the mere cost of maintenance—not at all difficult to do when scores of country estate owners are looking for ways of getting out from under the burden of taxation and upkeep costs. Through his contacts with many men glad to pay for a country vacation on an economical basis, he secured enough business to make himself a comfortable living as proprietor of a vacation resort.

LIVING

Continuing the presentation of a series of articles on money-making ideas which have been proved out in practice.

Money From X-rays



Plumbers, electricians, and artisans in numerous lines of trade have occasional use for the services of an X-ray machine which will show the location of wires within walls, position of broken pipes, etc. Recognizing this opportunity, a young Oregon man out of a job equipped himself with a portable instrument and solicited such business from likely prospects. He charges a fairly stiff price for X-raying a wall or whatever the object may be, and finds it easy to collect his charges since his negatives disclose information of much value to the contractor, and in many cases make it unnecessary to tear down a whole wall to find a single leaking pipe. X-ray machines are sold or rented in all large population centers, usually through an agency catering especially to the needs of physicians and surgeons.

Cleaning Carpets on the Floor

There are today a number of cheap rug and carpet cleaners which can be used while the carpet is on the floor and no fuss or bother in moving furniture is necessary. This material can be bought at the hardware store and if a fellow buys several cans of it and takes with him a good assortment of rags, he can build up a little business. The charge should be made on the basis of so much per square foot of rug cleaned. A six by six rug, for instance, is thirty-six square feet and about two hours will be needed to make the thing look like new. About four cents a square foot would be right for the price.

The nice part about this business is that a housewife will be most pleasantly surprised when the job is finished.

Oriental rugs properly should be cleaned on the floor, as described above—a service welcomed by many housewives.

Making the Ad Circular Welcome

Many retail stores distribute weekly advertising circulars which aren't always carefully read by the housewife. A young Canadian from Montreal made up a dummy circular in the standard 9x12-inch size, added recipes and home hints on the back, and sold a number of merchants on the idea of using his style of circular, quoting a price but slightly more than they were paying for their old circulars. Through arrangements with a printer, he got a very good price because of the standardization of style and the fact that circulars were repeat business every week. Recipes on the back he obtained from manufacturers of foodstuffs, from some of whom he received paid advertising. He now offers a prize each week to housewives who send in recipes that are used in the circular.

Dollars in Postage Stamps

An office worker capitalized on the misfortune of losing his job by collecting envelopes from office waste baskets and removing from them United States and foreign stamps which he sold in job lots to a local stamp dealer. Those who wish to work this income stunt will find the names of stamp purchasers in the hobby department of this magazine or in their local directories.

"Leg Work" Brings Income

Contact the editor of your weekly newspaper, if your community supports one, and arrange for a 50% commission on subscriptions you secure. Study the special features and correspondence columns of the paper before you attempt to sell subscriptions. Remember — the prospect's name in print is the best selling point for your paper! Take notes on improvements in property or other items of news, which the editor will be glad to print, enhancing your chances of securing a subscription from the owner of the property.

Money in Rocks

A mining engineer in Los Angeles, California, whose business suffered because of low prices for minerals and shut-downs in mining operations, now makes more money than ever before. In the desert and mountain regions he gathers various kinds of mineral rocks, and in his laboratory crushes the rock into small pieces. These are then placed in mineral souvenir boxes which jewelry stores sell for fifty cents and a dollar. Each box contains at least one gold ore sample, a cinnabar specimen, a sulphite, and others. The colorful array of the rock collection is of great display value, so that the product actually sells itself. Many buy them to send to their out-of-town friends. They are also in demand by school teachers for use in classroom study of geology.

Sharpening Cutlery

Sometimes the ways of making a few extra dollars are so obvious that they are not thought of at all. Very recently, a chap with a fractional horsepower motor thrown over his back and a small grinding wheel attached to it, called at the writer's house and asked if he could not sharpen all of the knives and shears in the house for the modest sum of twenty-five cents. It sounded like a mighty good bargain and all of these articles were marched out for him to work on. Within fifteen minutes, he was through and ready for another job. At this rate of payment he was making about one dollar an hour for the time he worked. He had little difficulty working half of the time he was out, which meant about $25.00 a week.

Caterpillar Farm

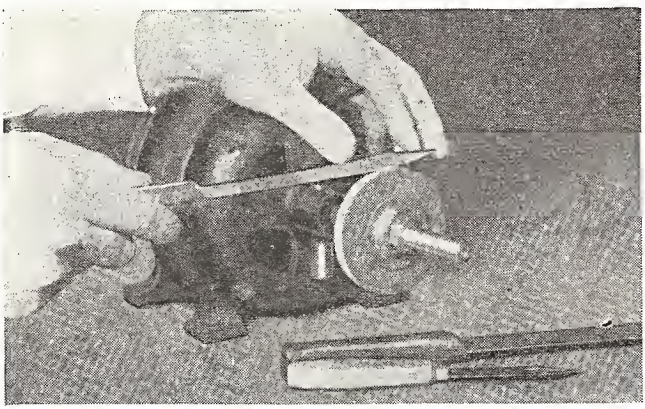
Four Duluth boys operate a caterpillar farm in a home basement which brings them good profits. They raise as many as a thousand caterpillars a year, which hatch into many beautiful species of moths. The butterflies are mounted and sold to entomologists throughout the country. Little money is required to start such a business. Complete instructions for hatching caterpillars may be had at your local library.

"Look At Our City"

A young man obtained photo albums containing 24 pages, on the covers of which he had stamped in gold "Have a Look At Our City." This done, he entered a town, obtained postal card views of local points of interest, and pasted one on each page. From the manager of the leading hotel he obtained permission to leave the album in the lobby for guests to peruse, after he had obtained the business card of a retail business to appear on each page with one of the postal cards. Charging $2 for inserting each business card in the album, he found it easy to sell his proposition because of the attractiveness of his advertising medium. Thus he made $48 per album, less trifling costs, and making four to five towns per week, cleaning up from $180 to $225 weekly.

Cleanup Salvage

Finding himself unemployed, a salesman called a number of real estate firms and offered to clean recently-vacated houses at no charge whatever. In the morning he picked up a list of houses vacated the day before, and calling with car and broom would sweep each place thoroughly, placing the refuse in a convenient place for the rubbish man to haul away, and leaving the place in top-notch condition for showing to tenants. His compensation came from salvaging old articles usually left in vacated houses, such as clothing, bottles, magazines, etc. At the end of the first week this salvage was sold for $18.



Fractional horsepower motors with abrasive wheels make money sharpening cutlery, either in the home shop or carried from house to house.

Profits From Spruce Gum

Gum which collects on the sides of spruce trees can be made to furnish a fair income to the man or boy who collects it and sells it to drug stores. Because the flavor of the gum is fascinating to many tastes, it brings around $1.25 per pound and there is no difficulty in disposing of it.

Renovating Headstones

This idea is particularly appropriate around Memorial Day. A high school youth, visiting the grave of his grandmother, noticed that the lettering on the headstones was hardly visible a short distance away. Letters were of the type that are cut into the stone. He painted the depressions with white lead and turpentine, and found that many people were glad to pay 50 cents to a dollar for similar treatment to stone memorials to their loved ones. The young man made as much as $15 per week in this manner.

Growing and Selling Herbs

A large bed of mint and aromatic herbs in her back yard has proved profitable for one woman. Several times weekly she sends neatly prepared bunches of mint by parcel post to hotels and cafes. They welcome her product for its freshness and cleanliness. Seasoning herbs are dried, pulverized, and put up in labeled bottles. These retail for 10 and 15 cents and grocers are glad to have them for their particular customers.

Daphnia Dealers

Several unemployed Philadelphians make $20 a week straining Daphnia out of ponds and streams with long-handled nets of fine cheesecloth. Daphne are reddish-brown water lice, about the size of a pin head, which are used to feed tropical fish. These men have worked up regular routes and keep fish stores which advertise "Daphnia —Fresh Daily" supplied with this portion of their stock in trade. Distribution is made the same day as the catch, for the Daphnia lives only a few days, and is spurned by the fish when dead. Daphnia are caught in all seasons, though the catches are rather poor in winter when ice covers the ponds and streams.

CASH FOR MONEY-MAKING IDEAS!

Have you worked out some ingenious, practical way of making money, either as a full-time job or a spare time activity? Perhaps some friend or neighbor, thrown out of work, has used his wits to devise some money-making scheme which brings better returns than the job he lost—this very thing has happened so often recently that many men look on depression as a blessing in disguise. For all accounts used in this money-making department of the magazine, payment will be made at regular rates. Here's your chance to become an author! Keep your article brief, and address it to Modern Mechanix and Inventions, 529 S. Seventh Street, Minneapolis, Minn.

Retreading Smooth Tires

Ideal as a depression occupation is that of retreading tires worn smooth in service. Trying to get as much service from tires as possible, thousands of motorists are today traveling on treadless tires, a very dangerous condition, especially in wet weather. Most of these motorists realize the peril of smooth tires but haven't the price of new ones. Good wages can be made by regrooving the tires of such drivers for 50 to 75 cents a wheel. An electric retreading outfit can be purchased for as low as $15, a cold grooving outfit for $2. A Portland, Oregon, man has averaged better than $5 a day for the last six weeks working this stunt.

Cents With Scents

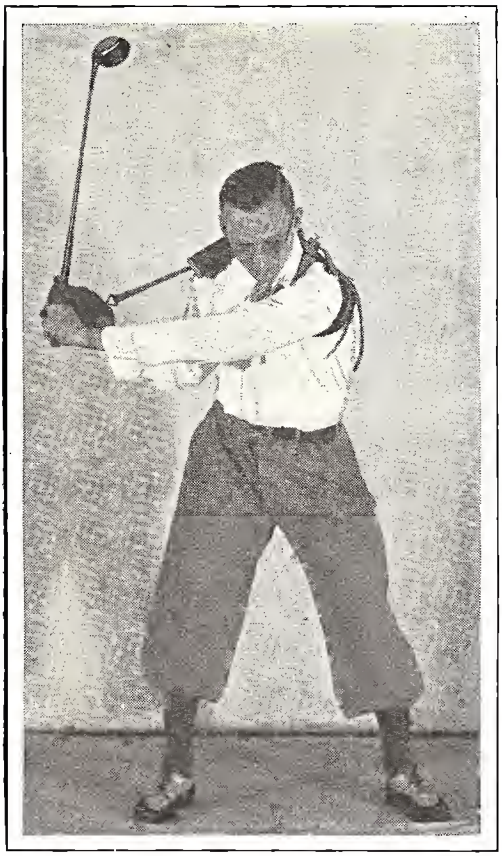
A young woman teacher unable to get a school purchased a 25-cent bottle of disinfectant, salvaged some clean rags from her home, and started a business of her own. Her services are confined to large offices which have phones used by many people during the day. For 50 cents a month she disinfects the phones at least twice a week. She now has 234 clients and makes 78 calls a day to keep up her schedule, but as the income is $117 per month and the expenses are negligible she says it is well worth it.

Telephone Service

A former telephone operator earns a good income by giving telephone office girl service to business and professional men. When they are absent from their offices, phone calls are switched, by a special trunk line arrangement, to the operator's phone, at her home. Her clients also keep in touch with her by phone, giving instructions and receiving messages. Service charges are from $1 a week up, depending upon the amount of attention necessary. Her business has grown

(Continued on last page of magazine)

Ingenious Shoulder Harness Teaches Proper Golf Swing



Golfer's harness which teaches proper golf swing, worn as shown here, keeps left hand always in absolute control, causing proper pivot and shift to left into hitting position.

SIMPLIFIED teaching of the proper golf swing is the purpose of an ingenious harness devised by Everett Nelson, Duluth, Minn., public links professional.

Worn as illustrated in the photo at the left, the harness keeps the left arm in absolute control until after the stroke. The right hand cannot overpower the left during the downswing.

The harness is so devised that the left arm is kept straight during the downswing. There is a slight pull directly against the right hand at the top, which retards right hand action, automatically causing the left hand, hip and shoulder to come into action.

Perfect Balance for Golf Clubs

A NEW golf accessory, which manufacturers claim will take five to fifteen strokes off the average golfer's score, has been introduced. The device is a metal cap which slips on the head of a driver, brassie or spoon to make a perfectly weighted club. Made of metal, the attachment cannot slip off in action, but can be easily removed by a twist of the wrist and carried in the hip pocket.

Weight to give club perfect balance fits over head as illustrated. Usable on brassie, driver, spoon.

Detachable Cleat for Golf Shoes

IDEAL for use by golfers, hikers, woodsmen, etc., is the new detachable cleat for shoes shown in the accompanying photo. Made of cross pieces of strap metal to which short spikes are fastened, the cleat attaches to the soles by means of snap fasteners. Two shallow holes must be made in the sole for the attachment of the cleat. Into these holes fit two sockets which take the fasteners by a half turn of a pin. The cleat can be shortened or lengthened for different size shoes by merely expanding or contracting the cross bars.

Manufacturers claim that attachment of the cleat in no way injures the soles of the shoes. The holes are so shallow as to be hardly noticeable in the leather.

Cleat for golfers' and hikers' shoes attach to sockets set into the soles. Note spikes in cleats.

Novel Radio in Pirate's Chest

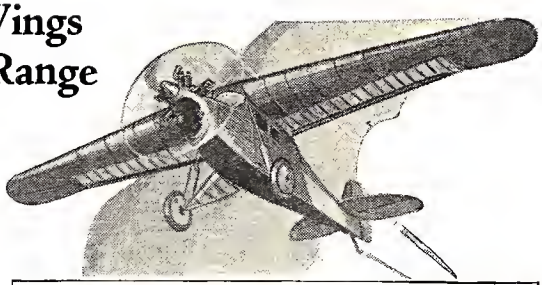
THE latest novelty in radio cabinet design has the form of a pirate's chest. When closed no knobs or dials suggestive of a radio set are visible. Scrolled grills in the sides make operation possible when the lid is closed.

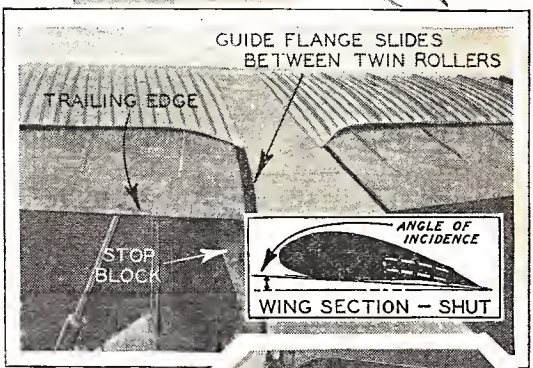
Pirate's chest radio—the latest in unique cabinet designs.

Airplane With Folding Wings Has Greater Performance Range

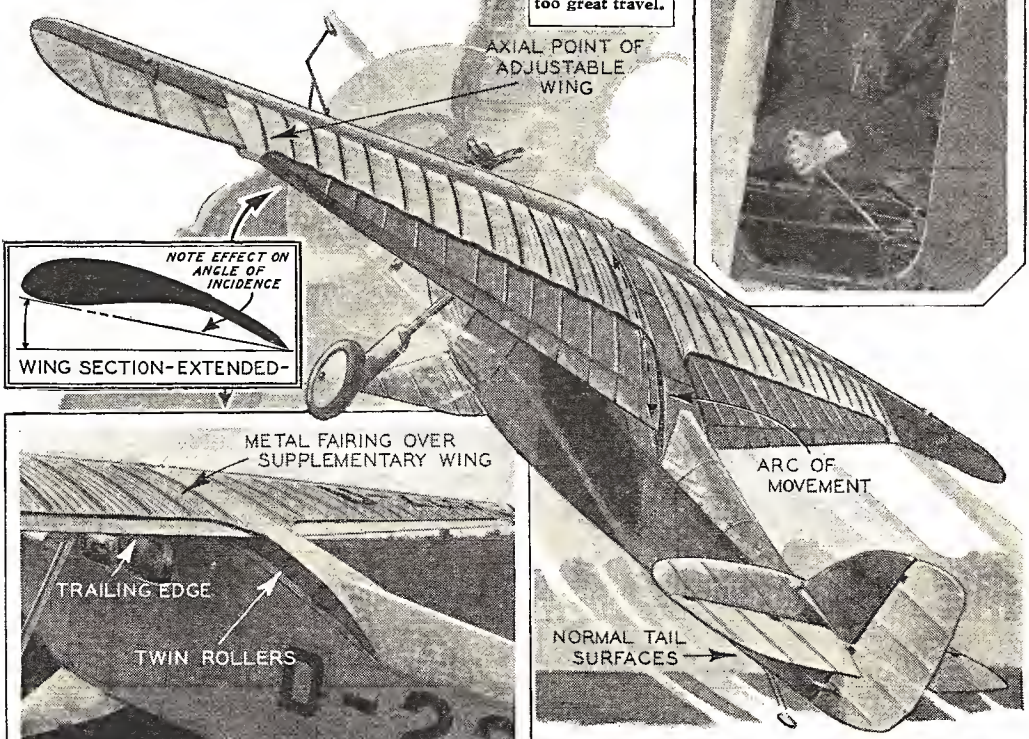
DESIGNED by Professor Schmeidler of the Technical High School of Breslau, Germany, a new airplane having retractible wing surfaces was recently proven to increase high speeds 30% and reduce landing speed 50%. The ship is powered with but 45 horscpower and was constructed entircly at the high school by students to prove out Profcssor Schmeidler's new angle of attack on the old problem of retracting wing surfaccs. Whereas old systems have added to or subtracted wing surface by increasing or decreasing the span, the Schmeidler system is installed on a taper wing cantilever monoplane, and achieves its effect by an increase or decrease of the chord at the root of the wing, the tip chord remaining constant. The wing, extended to greatest chord, also changes the angle of incidence. Reefed, it decreases angle of attack and increases speed as well.

The action of the reefing gear is simple. A rollcr chain runs around a circuit of pulleys. One end of the chain attaches to the flap butt and the other end to the control lever shown in the photo. A stick actuates thc amount of reefing.



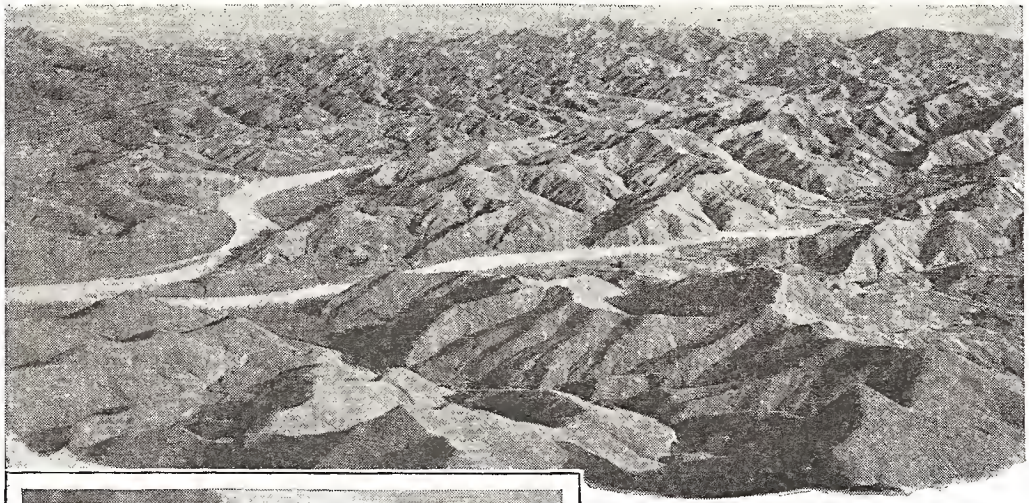


Top view, ship in flight with wing reefed. Stop block prevents wing from too great travel.



The general action of the wings is fanwise, with the pivotal point at outer wing tip. The root of the wing is shaped to the arc of its movement and is guided in its traverse by twin rollers. Photos show control lever and appearance of wing when reefed. The effect is to reduce the plane's landing speed and to increase top speed when in flight.

SCIENCE *Explains Origins*



"Loess" country in China, covered to depth of hundreds of feet by dust from Asian deserts.

A "Habub" of violent desert sandstorm about to descend on the town of Khartoum, in the Sudan, Central Africa.

When Sakurajima, Jap volcano, erupted in 1914, it buried villages for miles around in layer of volcanic ash. Above is scene in village of Kurokami.

Here is reproduction of old drawing showing "dust devils," as natives call whirlwinds, moving over plains in India. Dust is sucked into atmosphere, descending many miles away.

by CALVIN FRAZER

IN APRIL of last year the volcano of Quizapu, in the Chilean Andes, burst into violent eruption. Within a few days it spouted into the atmosphere, according to a conservative estimate, more than two cubic miles of mineral dust.

This dust, or so-called "ash," was spread far and wide over the continent of South America. Some of it was showered down at Rio de Janeiro, 1,800 miles to the northeast, while at Buenos Aires, more than 700 miles from the volcano, the falling material obscured the sky for 40 hours.

On a strip 400 miles wide the Argentine pampas appeared to be covered with snow. Much fine dust was shot to great heights; probably 15 miles or more. It was too high for rain to wash it down, and the fine particles settled very slowly toward the earth. Hence it was spread out by the winds into a thin veil that encircled the globe in the southern hemisphere and may

# of Terrifying Dust STORMS

Remarkable photo here shows sandstorm passing over Midland, Texas, Feb. 20, 1894, at sunset.

Here's Owens dust counter with which weather man measures number of dust particles in certain unit of atmosphere.

Eruption of Mt. Quizapu, in the Chilean Andes, deposited a layer of volcanic dust or "ash" over Argentine town.

have crossed the equator into the northern.

For months after the eruption this dusty haze in the upper atmosphere caused lurid sunrise and sunset glows and other striking optical manifestations not only in South America but also in Australia and South Africa.

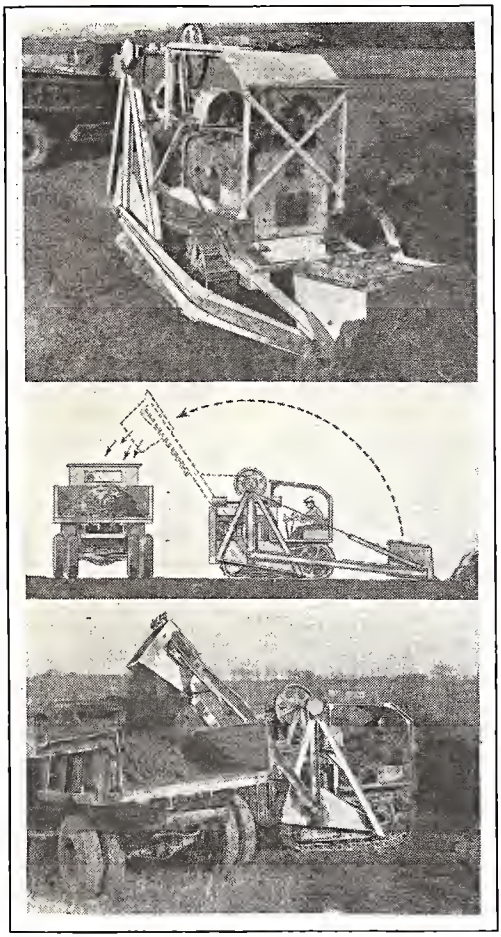
This episode illustrates a process of nature that is going on incessantly, though not always on so grand a scale, in different parts of the world; viz, the transportation of terrestrial matter from place to place in the shape of wind-borne dust. In the great majority of cases the dust is not discharged into the air by volcanoes but consists of soil material blown up by the winds. Such dust is often carried hundreds of miles, and sometimes thousands of miles, before it settles down.

Thanks to this process there is a constant interchange of soils between different regions, so that, for example, certain portions of the soil in which an Ohio farmer grows his crops originally came, via the air, from places as remote as Texas and Manitoba.

(Continued on page 137)

A terror to caravans crossing the Sahara are the traveling sand columns shown in this old drawing. Men and animals must protect themselves by crouching low till column passes.

Tractor Shovel Digs Dirt With Almost Human Motions



Motions of new tractor shovel are illustrated here. Scoop carries about half yard of dirt. Shield protects operator.

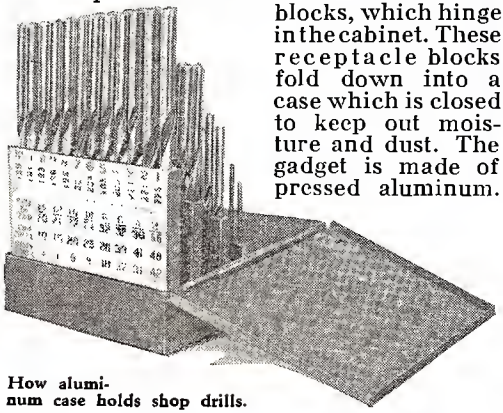
A TRACTOR which shovels dirt with motions closely resembling a human worker has been developed by two Staten Island inventors. At the left is seen in operation the first working model of their product.

The digging procedure is illustrated in the two photos and the drawing. To pick up a load, which is about half a yard of dirt, the shovel is lowered for a gouge of earth and the tractor is driven backwards. The operator now pulls a lever to lift the shovel over the top of the tractor, and the shovel is then tipped up so that it spills its load into the waiting truck, as illustrated in the lower photo.

This procedure, inventors claim, makes for greater economy of motion, and permits digging in a smaller space than would be used by a regular steam shovel.

Drill Case for Shop Convenience

A CONVENIENCE welcome in any workshop is a new drill holder shown in the photo below. The shanks of the drills rest in receptacles drilled in the aluminum blocks, which hinge in the cabinet. These receptacle blocks fold down into a case which is closed to keep out moisture and dust. The gadget is made of pressed aluminum.



How aluminum case holds shop drills.

Debunking Horsehair Snake Story

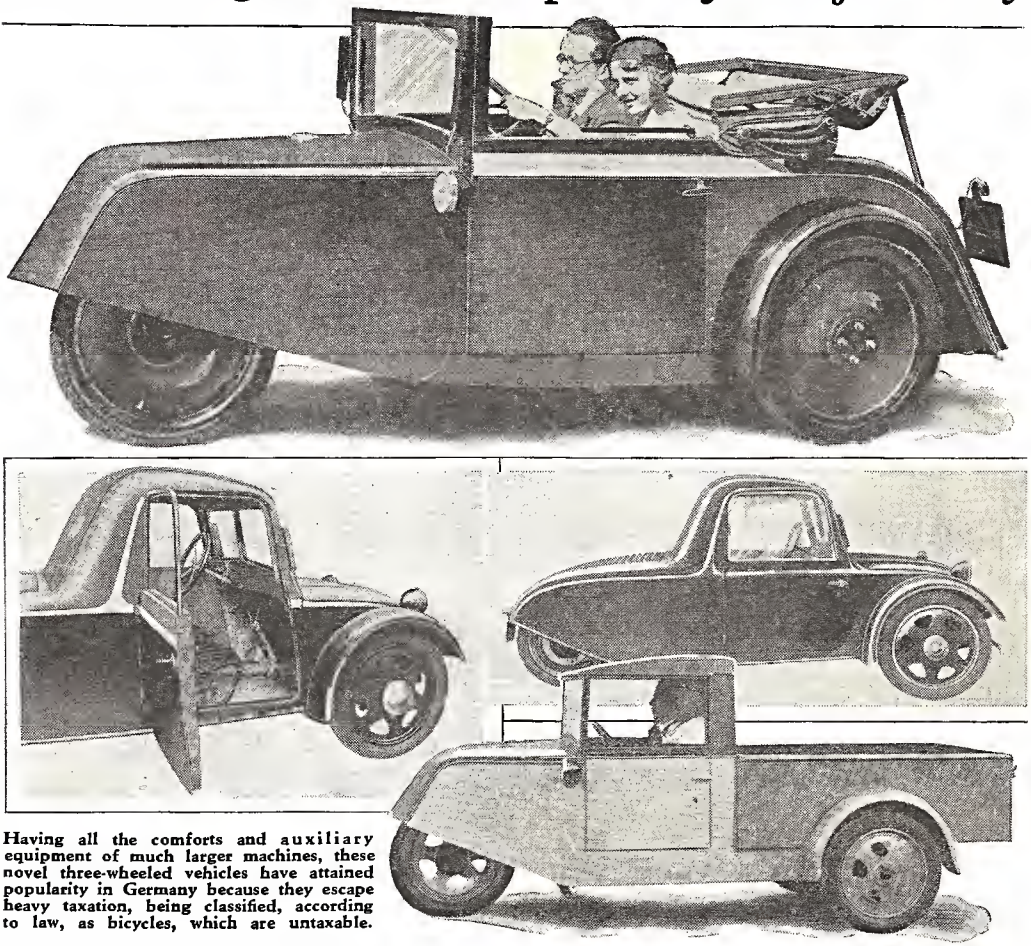
REAL facts back of the world-wide myth that a horsehair put into water will turn into a living snake are explained in a recent note to the American Nature Association by Mr. L. C. Peltier. Mr. Peltier believes that what is back of these beliefs is the finding in ponds or stream waters of creatures belonging to a little-known class of animals popularly called horsehair snakes, but known to naturalists as hairworms or threadworms. These animals have about the thickness and general appearance of a horsehair and may be a foot or more in length. People who see these living worms imagine that they are horsehairs come alive.

How Turtle Doves Coo Over Radio

Here's device that coos like turtle dove over the radio.

THAT radio noise which sounds like a turtle dove cooing is merely a wooden tube, similar to a pipe organ, which produces the dove's characteristic flutter by a flat metal disc revolving in a sound chamber. Blowing creates the sound, while operating the lever varies the tone.

3-Wheel Cars Win Popularity in Germany



Having all the comforts and auxiliary equipment of much larger machines, these novel three-wheeled vehicles have attained popularity in Germany because they escape heavy taxation, being classified, according to law, as bicycles, which are untaxable.

GERMAN streets and highways fairly swarm with small three-wheeled automobiles which make American tourists wonder why the fourth wheel was omitted. The vagaries of taxation furnish the answer.

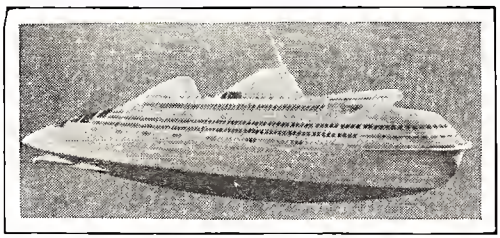
Four-wheeled vehicles in Germany are taxed heavily, but bikes are allowed exemption. The law states that a three-wheeled vehicle is reckoned as a bike, so German engineers developed a three-wheeled auto which circumvents the tax laws.

The photos above show four types of machines which are popular in Germany. They develop speeds between 30 and 40 miles per hour and seat two or three passengers. They also prove ideal for light delivery work.

At the top of the page is seen a 2-passenger runabout, which is heaps of fun for country driving. Steering is effected through the front wheel, while power from the midget motor is delivered to the rear wheels. The streamlined coupe shown in the photos below, however, reverses the process. The machine carries all the auxiliary equipment of its 4-wheeled relatives.

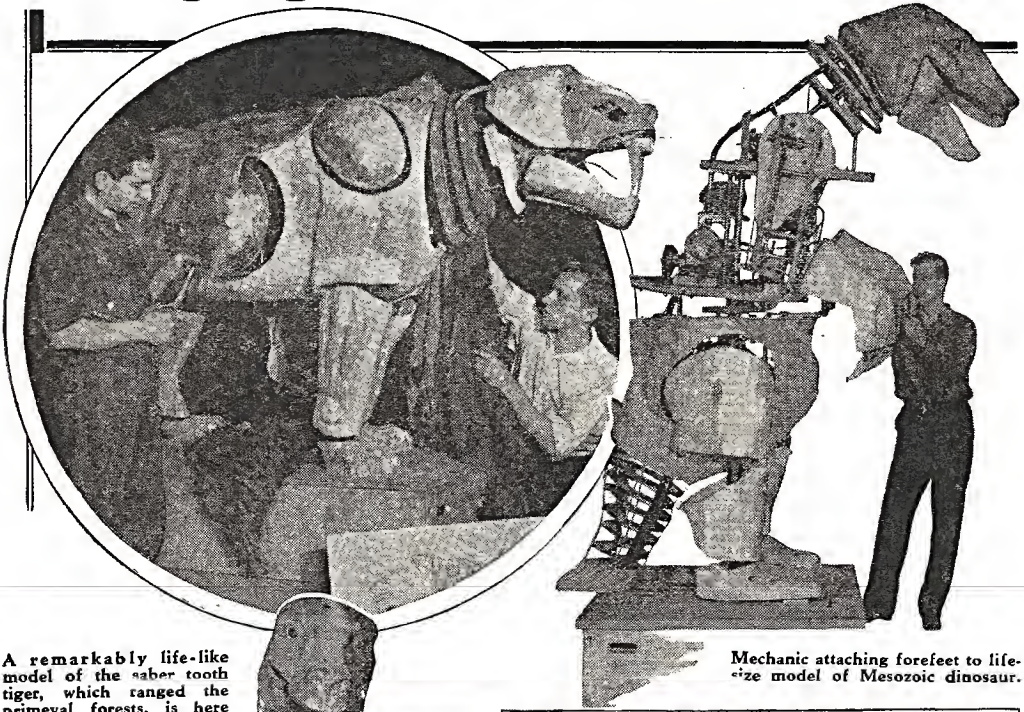
Freak Ship May Cross in 3 Days

TRANS-ATLANTIC crossings may be cut still another day if a grayhound is ever built from a model recently designed by Norman Bel Geddes. As shown below, the ship is enclosed entirely in a streamlined shell, all projections being eliminated, save the navigating bridge. Even the funnels dissolve into the form. The length of the liner will be 1808 feet, with a displacement of approximately 70,000 tons. Accommodations will be provided for 2000 1st class passengers.



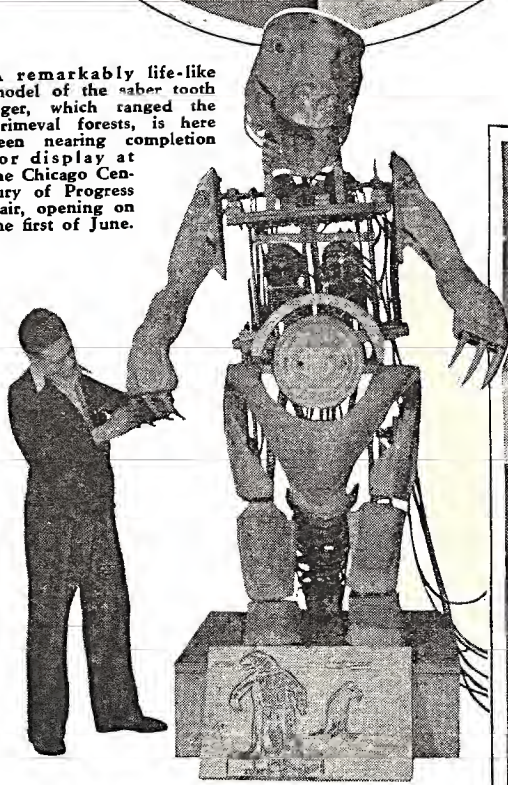
Model of streamlined liner which will cut ocean trips 1 day.

Bringing Primeval Monsters



A remarkably life-like model of the saber tooth tiger, which ranged the primeval forests, is here seen nearing completion for display at the Chicago Century of Progress Fair, opening on the first of June.

Mechanic attaching forefeet to life-size model of Mesozoic dinosaur.



Another view showing the mechanical "innards" of the dinosaur seen at top right. Note motors in the lung region. Driving a system of gears, cams, levers and pulleys, these motors cause beast to breathe, twist head, blink eyes, chew, claw the air and carry on in a general life-like manner. Application of artificial skin finishes the job.

Two steps in constructing model Holstein cow for Fair exhibition. Above sculptors are seen making model of living cow. Below, covering mechanical model, which moos, blinks eyes and gives milk, with skin of the ill-fated Holstein which furnished dimensions. Phonograph records furnish the sound.

to LIFE for Chicago FAIR

The primeval grandaddy of all the gorillas reconstructed by mechanics and sculptors for Chicago Century of Progress. Intricate mechanism operated by battery of motors causes the brute to simulate movements of the living monster which once roved the prehistoric jungle, inspiring terror wherever it appeared. Visitors to the Fair understand fears of cave men when they watch the model breathe, blink its vicious eyes, open its mouth and emit ear splitting roars, and thrash the air as if in a fit of rage.

Above is seen a model of the shovel-snout pachyderm opening its huge mouth. Mechanism demonstrates how the beast sweeps up edibles onto the shovel-like extension on the lower jaw with its trunk. The belly of the model expands and contracts with life-like breathing movements. At left is seen the huge hairy mammoth which will show Fair visitors what ice-age inhabitants of arctic regions looked like. Height of model is 14 feet, length of tusks, 11 feet.

Chicagoans were terrified one day to see this life-size reproduction of a dinosaur ambling down city streets on its way to the fair grounds. A creation of Messmore and Damon, 30-foot monster twists its reptilian neck and tail, breathes and chews anything you put into its giant mouth. All the mechanical monsters you see illustrated on this page may be seen on display at the Chicago Century of Progress Fair. Electric motors, radio, loudspeakers give illusion of life.

Violin Tones Amplified Twenty Times Without Distortion

Mechanical vibrations of violin strings are transmitted through bridge to electro-static pickup in resonating chamber. Cord carries tone to amplifier in cabinet at the side. Prominent orchestra leaders in the East have placed orders to electrify their stringed sections with this new amplifier.

WHILE violins have long been known for their sweetness in tone, under orchestra conditions they have lacked volume. A device recently invented, however, solves the problem of amplification, magnifying the tones of stringed instruments more than twenty times without distortion, and with mellowness and sonority heretofore impossible.

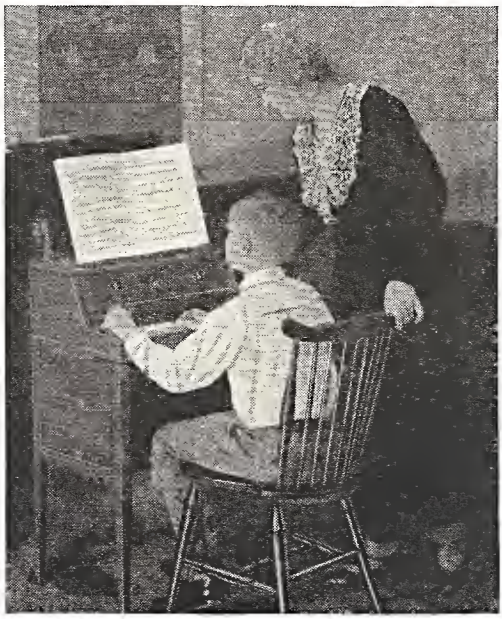
The new instruments are similar in every respect to the standard instruments. An electro-static pickup fits inside the resonating chamber, from which a cord leads to an amplifier unit contained in a portable case placed next to the player, as illustrated in the accompanying photo.

The violin, viola, cello, guitar, mandolin and banjo have been equipped with the device, while equipment for other instruments is in a process of development.

Electric Piano Is Music Novelty

ANOTHER addition to the growing orchestra of electrical musical instruments is a piano-like device on which the performer may at will produce sustained tones which resemble any one of several stringed, wood wind, and brass instruments.

The device is played much as though you were playing a piano by fingering it one digit at a time from a keyboard, and "pedaling" with the other hand on a small knob which regulates the volume and vibrato effects. The source of the tone is a small glow discharge tube coupled to an amplifier.

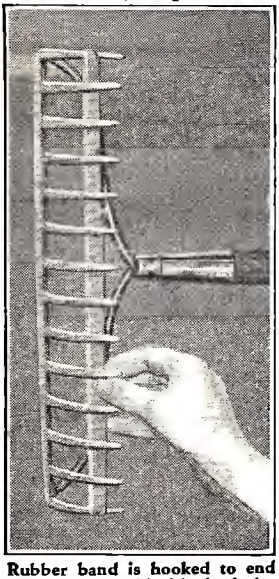


The electric piano is played one key at a time, while one hand regulates the volume with knobs on front panel.

Inner Tube Improves Garden Rake

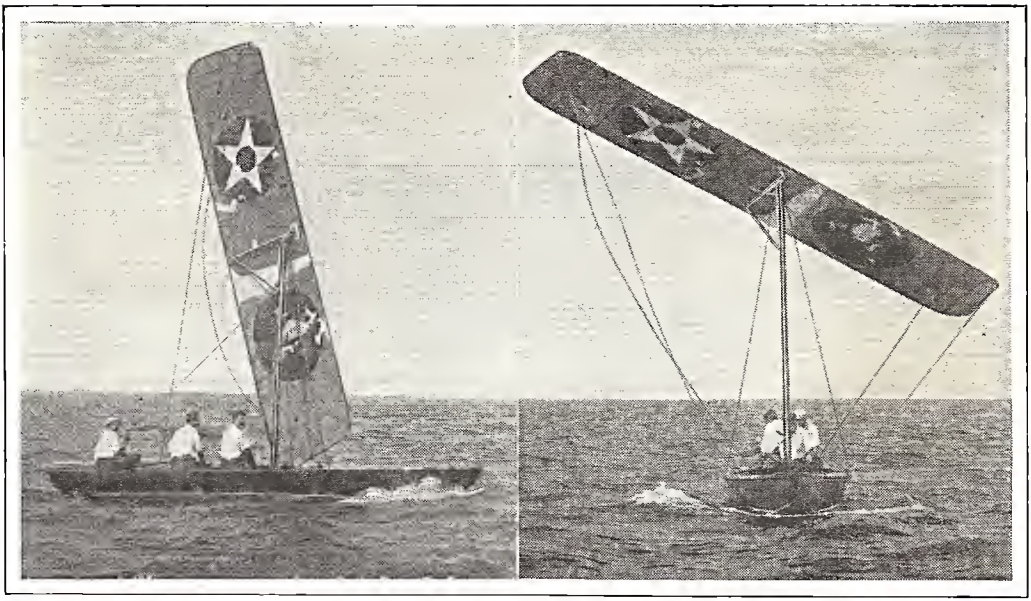
THE raking of fine material that would ordinarily slip between the coarse teeth of an iron rake may be accomplished by use of a ½ in. band cut from an old inner tube. Fit the band over the first and last tooth of the rake ½ in. from the bottom so that it is on the inside of all of the teeth, as shown in the accompanying photo. When in use this band helps catch the fine material and acts as additional teeth in the rake.

Regulate by raising or lowering the band on the teeth.



Rubber band is hooked to end teeth and passed inside the forks.

Airplane Wing Performs All the Sail Maneuvers of Canvas



Something new in sails—a wing from old fighting plane mounted atop a mast. Builders say their boat hits off a neat clip.

THREE Los Angeles boating fans devised a sail for their craft that wins all honors for uniqueness. Take a look at the photo above and you will agree.

The plane wing, salvaged from an old army fighting ship, is mounted atop a mast in such a way that it can be shifted to have a starboard or port list. Our informants do not state precisely how they manipulate the wing for the various sailing maneuvers, but they do state that they hit off a neat clip.

The chief difficulty encountered is instability. Choppy seas make heavy going.

Building Rome in a Day—in Model

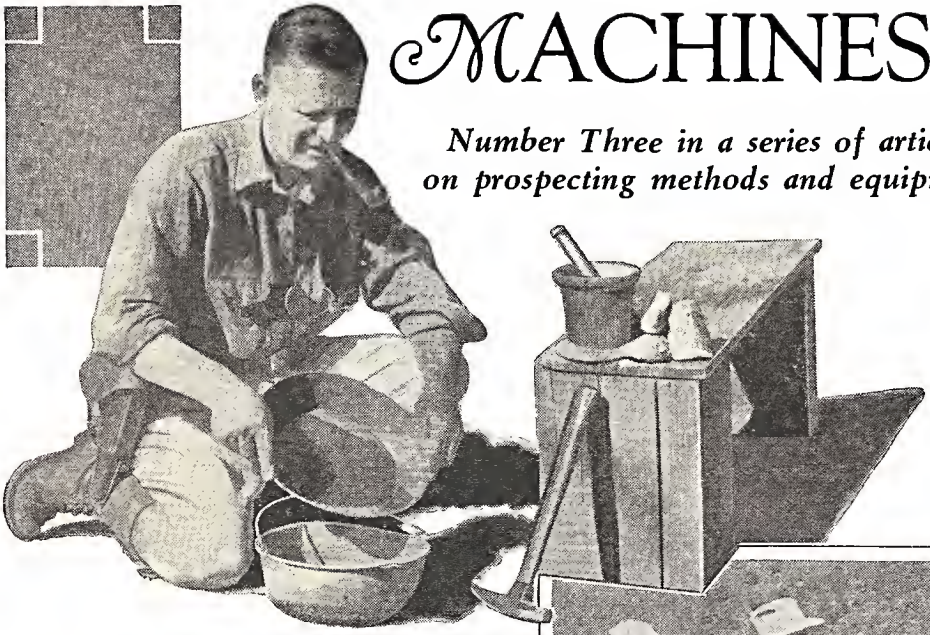
THE ancients couldn't build Rome in a day, but modern model-makers can. Such a feat was recently performed in the Memorial Hall, Philadelphia, where a huge plaster relief model of the Eternal City was assembled much in the manner of one of our popular jig saw puzzles.

The model was designed by Paul Bigot, Grand Prix de Rome, and shows ancient Rome at the height of its glory. About the center may be seen the famous Colosseum.

Workmen assembling the huge relief model of Rome as it was in its day of glory. Note Colosseum in the center.

MACHINES for

Number Three in a series of articles on prospecting methods and equipment



Minimum requirements in the way of equipment for the prospector are shown above. Mortar and pestle for breaking up ore, geologist's hammer for breaking pieces out of rock formations, and pan for washing out the yellow metal for a rough estimate of value of find.

THERE are several reasons why the gold seeker of 1933 should know about the "placer machine" and where it fits into the field of low-cost operations. In previous articles we have shown how the sluice, rocker or long tom, crude, hand-made machines, increase a man's efficiency four to six times over hand panning. Those home-made machines are equipment of miners of seventy years ago. The placer machine is a modern, machine-age advance over the rocker, sluice and tom in somewhat the same way that they are ahead of the primitive gold pan.

The placer machine is designed by able engineers with practical mining experience. It is tested out under different conditions, proven, and checked in operation. Before you buy a placer machine, find out if it has been thus tested over some period of months in the field. Being so designed, the placer machine has a higher efficiency in retaining gold, especially smaller particles, and may pay fair returns on old placer grounds that have been worked by cruder methods. That is the first reason today's miner must consider the light, portable machine of this type.

Working "Dry" Placers Profitably

Second, advanced models are equipped with tanks that catch, settle and re-use the water, over and over. "Dry washing" is highly unsatisfactory. So, even though water has to be hauled in barrels or in a tank, the placer machine makes wet operations on dry sites possible.

Probably a higher per cent of dry placers remain than any other type and this water-saving machine often will make their gold available. These light, portable machines cost from about $200 to $600 complete and if there is any gold in your placer they will soon pay for themselves.

Small, portable placer machine costing $200 to $250, gas motor driven, water pumped back for re-use, shown in action along Rio Grande. Especially useful on dry placers.

Third, one man can operate the machine if necessary. The power unit, a little gasoline engine, will take the place of another man that would be required for a rocker and sluice.

Fourth, the machines in the upper range of prices increase efficiency so one man can handle as much as two yards per hour instead of three to six yards of earth per day as in sluice, cradle or long tom.

PLACER GOLD *Miners*

by ARTHUR HAWTHORNE CARHART

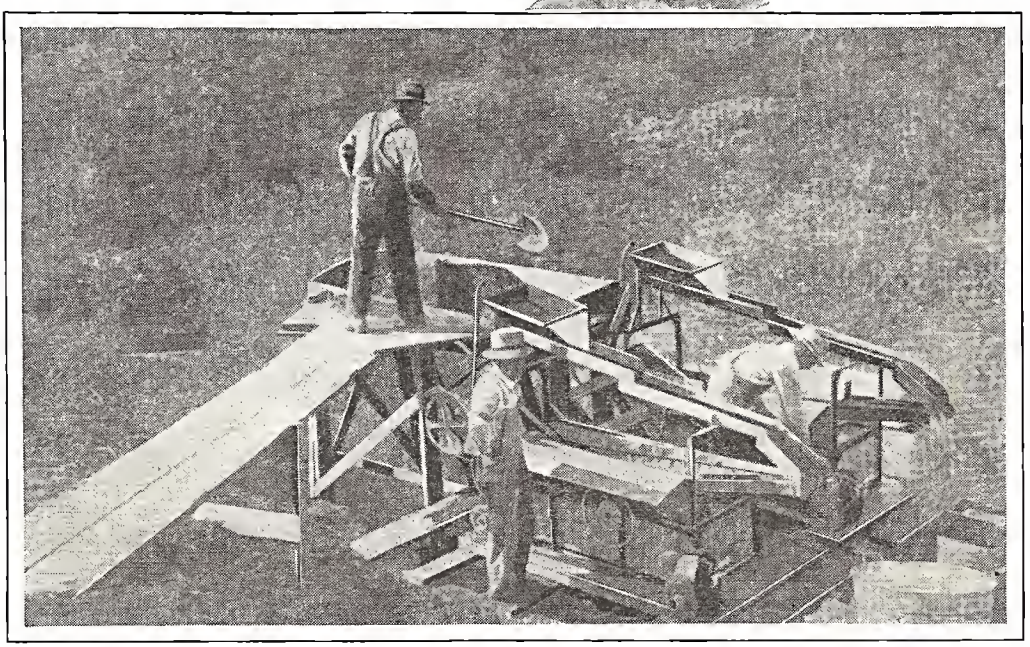
The placer machine is a modern, motorized, all metal, portable, compact outfit for the recovery of a high percentage of placer gold, with a minimum of water, a minimum of man labor. They are the logical next step for the small operator who has located fairly good placer ground, has sluiced out a "stake" and wants to put himself in a position to get the fullest cash return possible from his find with the least dollar-per-unit cost. Where the prospector has uncovered a limited area of placer ground of $1 per yard or better, he can best handle it, with his own one or two or three-man crew, by one of these models of placer machine.

For a moment we consider the larger placer machines that have a capacity of 800 yards per day. The small operator should know about these.

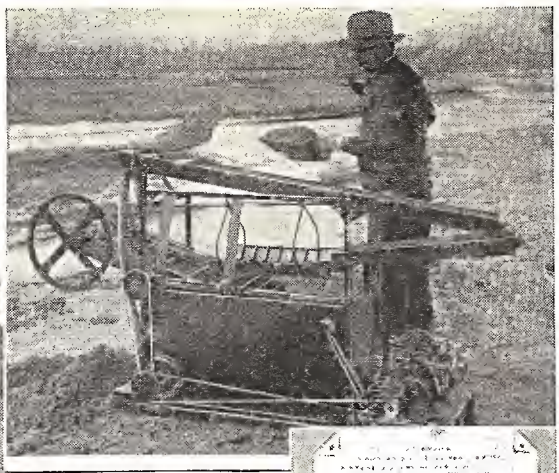
If you have located a limited placer that runs consistently around 20c per yard, there is not enough yardage to interest a dredge company. It is too lean for even a small portable placer machine to make money. Or, another situation, if you have located a placer where there is not enough water to run a dredge, yet enough to run a placer machine of the 800-yard capacity—there is another point at which to turn to the big placer machine. They are the equipment that allows the in-between placers to be worked; placers not rich enough for small operations, but too small in extent for dredging, or too dry for a dredge.

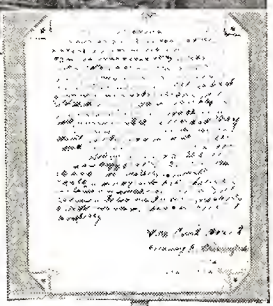
These larger placer machines are unit powered, dry land editions of a dredge boat. They cost from $20,000 to $35,000 each, but it is easy to reckon that such a machine operating on placer ground running 50c

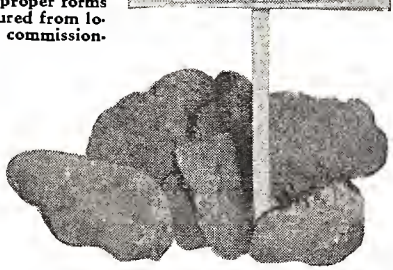
Method of putting amalgam in potato and baking out gold is shown. Mercury is squeezed from potato pulp, leaving gold.



Two placer machines installed in California. These cost $650 each and have a capacity of two cubic yards per hour each, as compared to the three to six yard per hour capacity of one man operating a sluice or Long Tom, whose construction was explained in the May issue. Used in working dry placers not extensive enough for big dredge operation.







Above—The copper riffles in the belly of this placer machine, agitated by motor, catch the finer gold. At left, portable forge for keeping miners' tools sharp, one of many equipment pieces brought out for the new prospector. At right, location notice of claim. The legal wording varies in certain states, but proper forms can be secured from local mining commissioners.

(which is a fair average of placer dirt values), will scoop out $400 worth of gold per day, gross, and even with the pay of a six or seven-man crew and supplies deducted, will soon pay for the cost of the machine. As it runs on a track, is compact, light, and fairly portable, it has a flexibility in use not possessed by the dredge and is the very latest development in handling moderate-value placer deposits in our West.

Finally a word about the dredge. It requires vast quantities of placer dirt, can operate on as low values as 10c per yard in gold if there is sufficient volume of dirt, costs upward of $100,000 per dredge, sometimes running to a quarter of a million or more, but by the very volume it is capable of handling, still makes money. It requires enough water to keep it afloat and supply its operations. The small operator is interested in this sort of a project only if he has located a vast quantity of low grade earth with plenty of water available.

We have taken up these machine methods of placer mining for a definite reason. More fortunes are lost in the mining game through not knowing what has been discovered and its potentialities than for any other reason. The small time operator who goes into the field looking only for one type of placer or mine, is going on a bear hunt with only one cartridge.

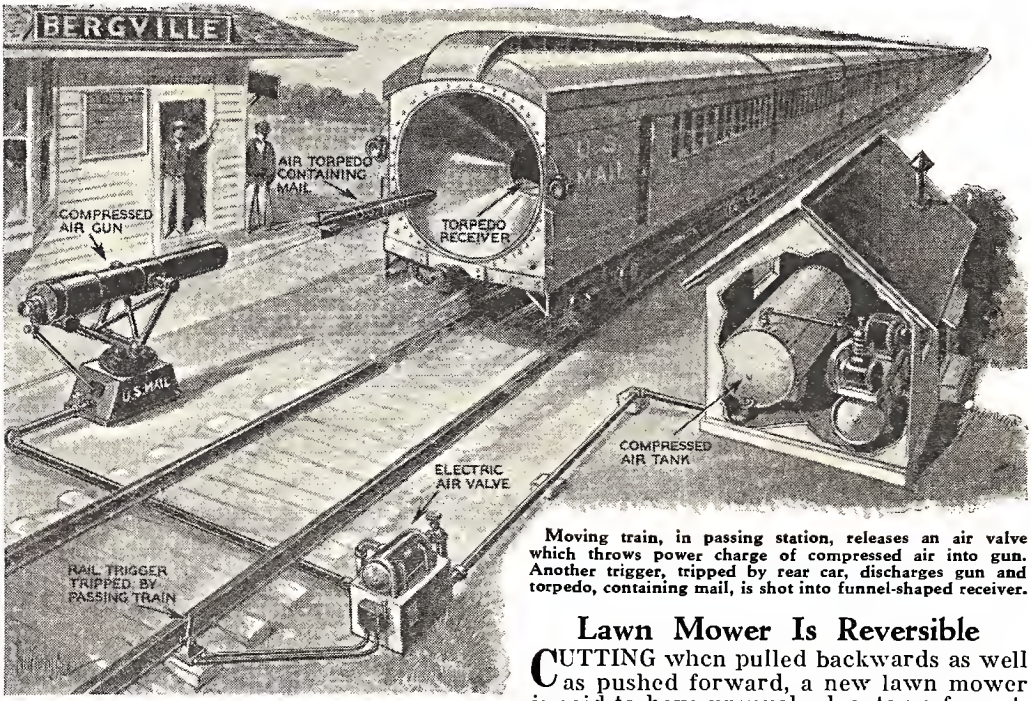
There is one other bit of placer equipment that must be discussed before we quit this field. That is the "dry washer."

These are a last resort on ground that is so dry, and so far from water, that no other method will be possible. Like the cradle, sluice or tom, they utilize the fact that gold is heavier than other material and settles out when there is agitation. By using cloth riffles, forcing puffs of air up through them, and keeping the dry material astir, a fair portion of small, gravelly gold is retained while other material is blown away. But flour gold is almost totally lost. Also, larger nuggets may be lost right at the grizzly for only finer material may go into the riffle box. There is a record, in Arizona, of one nugget worth $152 being picked up out of the rejected material that would not pass through the grizzly.

Prospecting methods on the dry placer are dry panning, using a bellows and the wind to blow away lighter materials, or

(Continued on page 141)

Compressed Air to Shoot Packages Into Moving Train

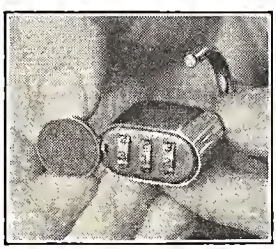


Moving train, in passing station, releases an air valve which throws power charge of compressed air into gun. Another trigger, tripped by rear car, discharges gun and torpedo, containing mail, is shot into funnel-shaped receiver.

ENGAGING the attention of mechanical engineers who are trying to figure out ways and means of restoring the railroads to a profit-making basis, is the idea illustrated above, in which a torpedo-tube containing packages of mail or express is shot into the funnel-like car at the rear of a moving train, making it unnecessary to stop and pick up small shipments.

Such are the wonders of compressed air that the stunt is perfectly feasible. The streamlined steel container would be inserted in the pneumatic gun. The passing train, reaching a certain point, would trip a release valve which would send a charge of compressed air into the gun. Another track contact would then be closed and the torpedo tube would shoot automatically into the compartment built to receive it. Torpedo speed would be but slightly greater than that of the train.

1000 Combinations in Keyless Lock



Setting the combination disks.

USING a coin as a tool, a new lock can be set in any one of a thousand different combinations. It is like an ordinary padlock except that 3 disks containing figures from one to zero appear in its base.

Lawn Mower Is Reversible

CUTTING when pulled backwards as well as pushed forward, a new lawn mower is said to have unusual advantages for cutting on slopes or under overhanging shrubbery. On terraces the machine is pushed up the incline and cuts as it comes down, aided by gravity and minimizing the physical effort needed from the operator. Height of the cutting blades is also adjustable so that high or close cropping (the former being advised as producing better turf) is obtainable at will. A semi-circular metal lever, extending up the handle, effects reversal of cutting direction in an instant.

Operator is moving the toothed lever which reverses mower gears so that it cuts when pulled instead of when pushed.

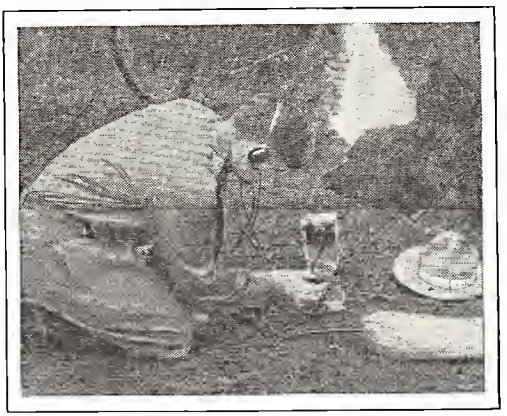
Portable Pipeless Instrument Produces Pipe Organ Music

Producing full range of sound effects of a huge pipe organ, this portable electric instrument can be used by orchestras, churches, or in the home. Keyboard is standard seven octave.

A PORTABLE electric organ which has none of the usual pipes but which produces music electrically has just been put on the market for use in orchestras, churches and homes. As shown at the left, the player sits on a special wired bench and his body acts as conductor and condenser. One foot pedal regulates volume while another controls tremolo in adjustable beats. Tone quality is varied by turning a knob above the standard size seven octave keyboard. The cabinet houses an amplifier and two speakers for reproducing high and low frequency tones. An electro-mechanical unit consists of a series of phonic wheels for generating the different electric frequencies which produce the sounds. It is said that the instrument always stays correctly in tune. Earphones are provided for the purpose of silent practice, to avoid disturbing others. The instrument is the creation of Ivan Eremeeff, Russian physicist.

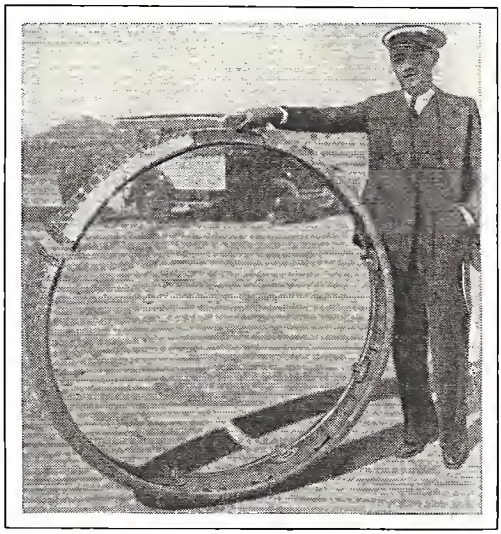
Portable Radio for Forest Patrol

UNCLE SAM'S forest patrol now has an additional weapon to aid it in the constant fight against forest fires. It is a tiny portable radio which weighs only 14 pounds—a combination transmitting and receiving set, amply light enough to be carried by the man in the field. Transmission and reception of voice and code over a distance of 10 miles is possible under adverse conditions. The set, shown below being demonstrated by A. G. Simpson, of the Vancouver, Washington, experimental station of the forest service, uses a crystal transmitter with a master oscillator power amplifier. A 70-foot antenna is used. It is expected to increase fire fighting efficiency by permitting the patrolman who discovers a fire to report it instantly to headquarters.



Marvelously efficient is this tiny radio which receives and transmits over a ten-mile distance. It weighs 14 pounds.

Mirror Reduces Airplane Roar



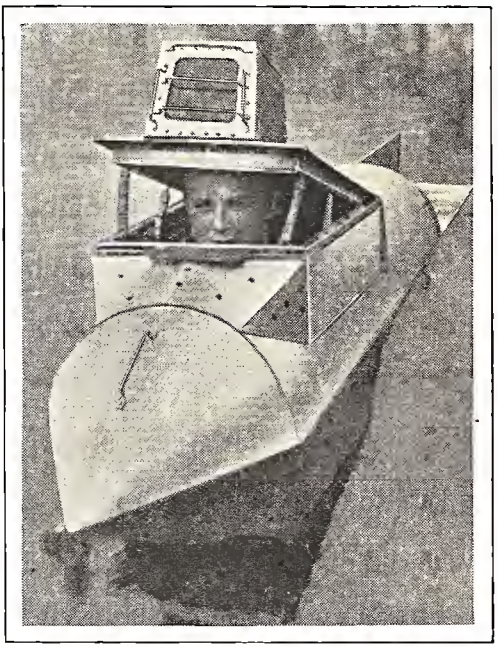
George Kreigher, Pan-American Airways pilot, is shown pointing to mirror piece on motor ring which enables pilots to reduce engine roar caused by "out of tune" propellers.

A MIRROR-LIKE piece of polished metal, fastened on the metal ring cowlings encircling the two wing-motors on a trimotored airplane, now enables pilots to synchronize the speeds of the three motors and thus eliminate noises that have bothered plane travelers.

The pilot sits in the nose of the plane, back of one motor and between those on either wing. By watching the reflections of the front motor propeller and one side propeller, he can adjust their speeds uniformly by matching the patterns they reflect on the metal. Much of the sound that bothers tri-motor passengers comes from "out of tune" propellers.

Thrilling Sport in One-man Submarine Towed by a Boat

DIVING 15 feet below the water in his play submarine, which is towed back of a motorboat much as a plane tows a glider aloft, James Bolar, of Oakland, California, experiences unique thrills in a sport all his own. He lies flat in his submarine, looking out through a conning tower, and by manipulation of the rudder levers is able to make his craft perform thrilling maneuvers while a motorboat pulls it to give forward speed. The sub is 10 feet long.



James Bolar lies lengthwise in his 10-foot submarine, dives and cavorts under water by manipulating fin and rudder. The sub is towed by a motorboat for forward speed.

Device Shows Correct Pen Position

Poor writers are made good by pen support shown above, which makes good writing a habit.

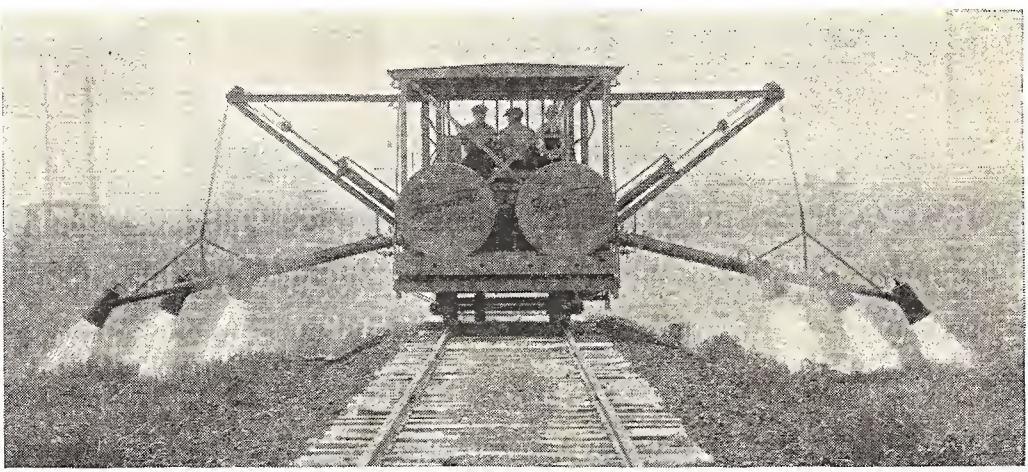
POOR writing habits are corrected and the art of penmanship easily acquired by the use of a wire tripod device, as shown at the left, which holds the hand and pen in correct position for writing. The device is a sort of tripod which holds the palm in proper alignment with the pen and the arm.

Weed Incinerator for Railroads

FEARSOME in appearance is the wheeled incinerator shown below, which spouts searing flames at high pressure to eradicate the weeds growing along railroad tracks. Derricks support long arms on either side of the car which control the placing of the flames. Oil is used as fuel. After undergoing this withering blast, weeds are disposed of for the season.

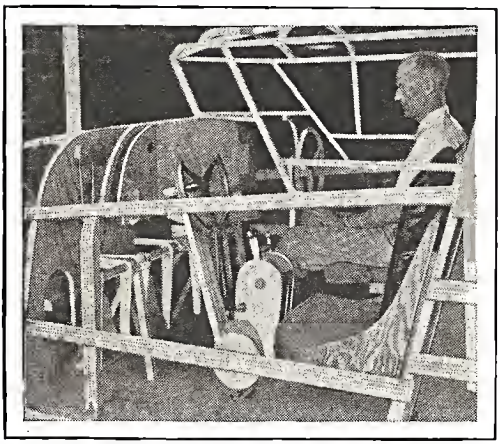
Steel Teeth Instead of Gold

THE last obstacle to cheap manufacture of welded steel teeth or bridgework has been removed by a recent Belgian method for electric welding steel teeth to plates. Rustless steels are, of course, employed. Experiment along these lines developed in Germany during the war, when gold was unobtainable for dental work. Teeth moulds are made from plaster models.



With a total spread of 36 ft., this flame-thrower withers every living thing growing alongside railway tracks, and thus reduces risk of fires which often start from locomotive sparks dropping in tinder-dry weeds. Flame-arms are controlled by derricks.

"Mock Up" Plane Used to Try Out New Design Features



Frank Canney, project engineer for the Boeing Airplane Company, of Seattle, is here shown checking details on a new plane using built up parts of plywood to test sizes.

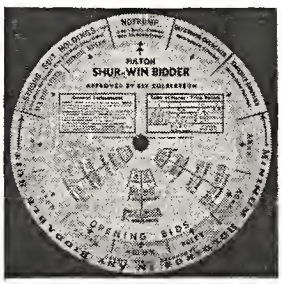
ANY engineer who has done any real designing knows that it is expensive to achieve direct results with the pure drawing board method. Consequently it is refreshing to find one engineer, Mr. Frank Canney, project engineer of the Boeing Airplane Company, of Seattle, who uses plywood frames and dummies to get just the right feel to things before he scratches up a lot of drawing paper. Mr. Canney outlines the approximate sizes of controls, framework, seating, etc., and then proceeds to make dummies in wood. These cheap dummies he can change readily, then he makes up his regular design using standard steel and aluminum and the regular materials of design. When done the design is correct the first draft. Clever, these Canneys!

Midget Plane Flies on Low Power

OVER in France there has recently been developed a light plane called the Mon Tut which is a sort of cycle car of the air. It is a single place high wing monoplane of very light construction powered with a V type British motorcycle engine of, we understand, about a ten horsepower rating. No figures are available on the wing span, length or loading, and we have been met with a wall of silence in trying to discover these from the designer.

Apparently the plane has a plywood fuselage of very simple box like construction. The motor is set low and stands upright as in motorcycle engine practice, and therefore no conversion is necessary. The drive is by a special chain to a shaft having its own thrust bearing. Interesting possibilities for a flying boat are approached through this design.

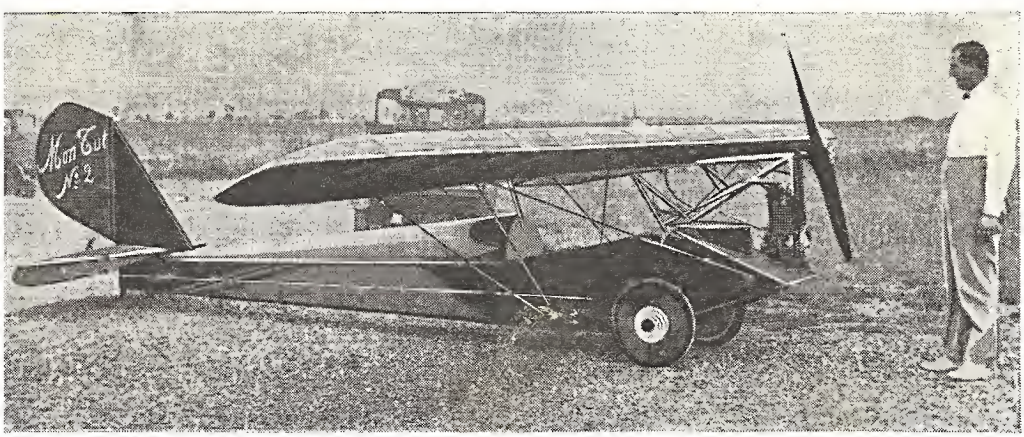
Win at Bridge With This Bidder



By adjusting holes in the dial to correspond closely with one's cards, proper bids are shown.

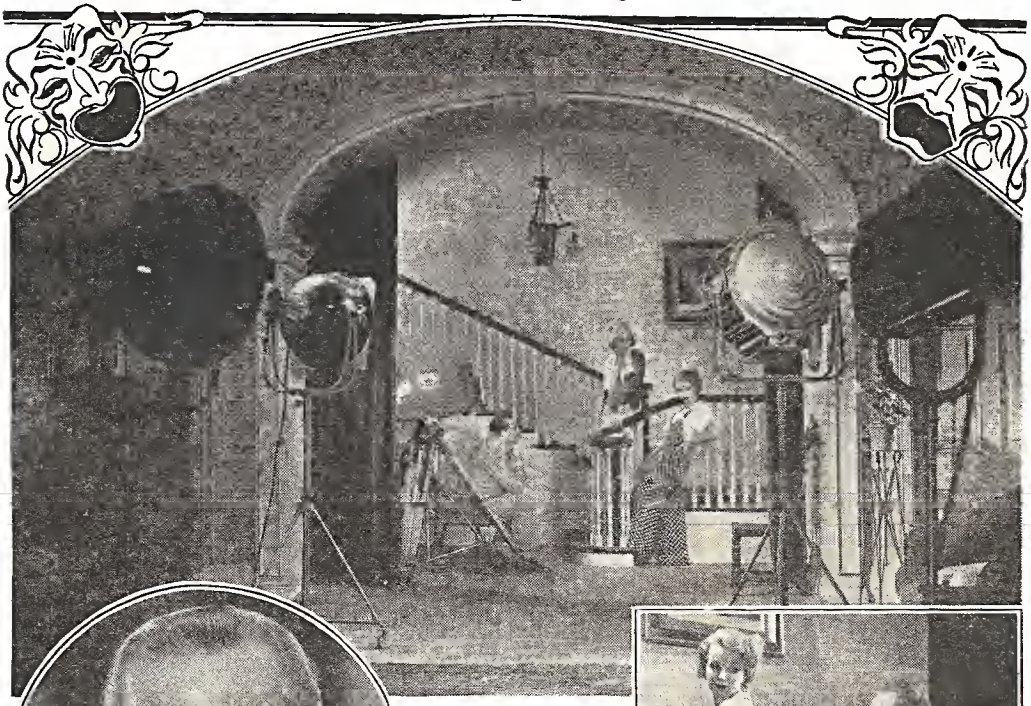
CONTRACT bridge is a game of brains and skill. If you have one of these little dial gadgets it becomes a matter of mechanics which can be played by anyone who can operate a dial telephone. This leaves out senators, but that really doesn't matter, for anyone who can't use a dial telephone wouldn't be interested in anything more complicated than Big Casino.

It seems that the hitch in contract bridge is the bidding. With a "Shur-Win Bidder" all one has to do is turn the dial to that section corresponding nearly to one's holdings.



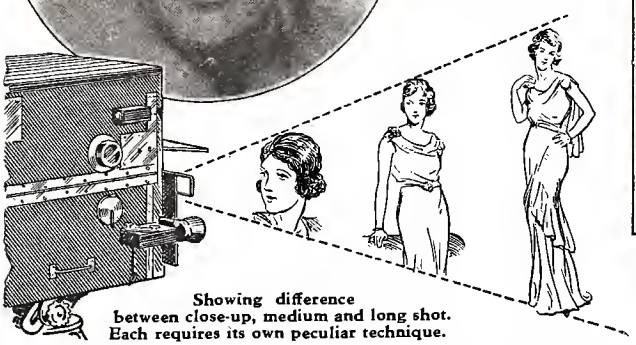
This little airplane is the product of a designer who lives in France. The plane is powered with a 10 h.p. English motorcycle engine and is said to have turned in some very good flights, although it is light and seemingly fragile.

School for Starlets Run by Movie Director



Stairway and door shots are hardest for beginners to handle. This shows the set which Mr. Stuart Walker, left, uses to train embryo players in proper behavior before camera.

Mr. Walker is here shown using his standard prop staircase in showing Sari Maritza the proper paces for some bit of dramatic action which is to be used in a coming version of a drama.



Showing difference between close-up, medium and long shot. Each requires its own peculiar technique.

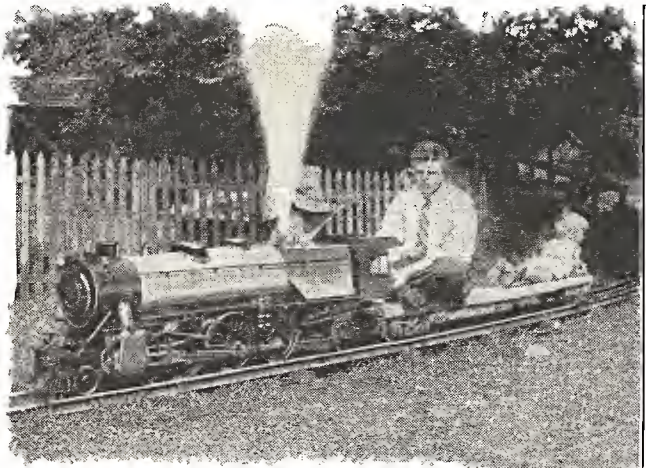
PARAMOUNT Studios in Hollywood have placed Mr. Stuart Walker, famous dramatic coach and movie director, in charge of a novel sound stage which is more properly called a "School for Starlets." Here embryonic players are taught the rudiments of the peculiar pacing required for acting in the talking cinema.

The stage consists of a set in which a standard staircase, a window and a portico are installed. Action in these settings is notorious for stumping beginners, and here under the skilled direction of Mr. Walker, himself a well known thespian, recruits to the ranks of the film great are shown what is meant by pace, and timing and voice direction.

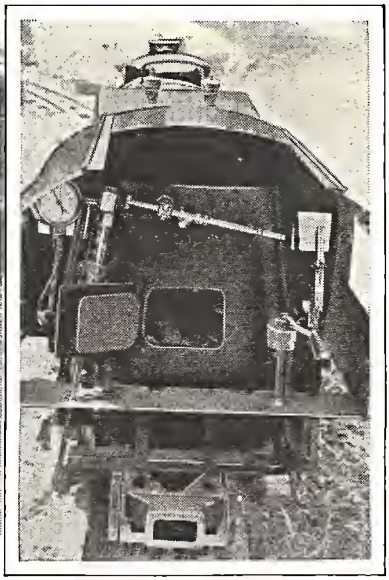
Here the difference between close-up, medium and long shot technique is also explained.

The closeup is used to express deep emotional or spiritual reaction. The long, full length shot is best adapted for scenes showing action, while the medium shot is used generally where moderate action is enacted by several people.

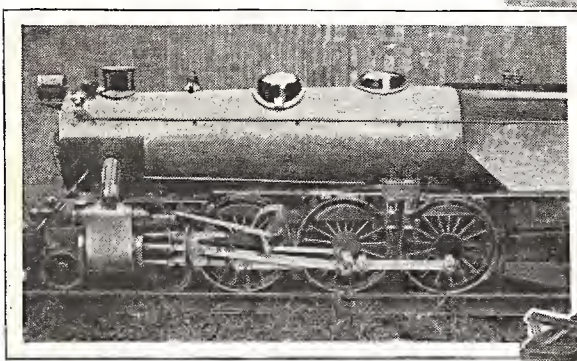
Masterpieces of the Model Builders' Art



A perfect reproduction of a Pennsy Mogul, built by Calvert Holt, of Conn. Hauls five tons, weighs 1250 lbs., length 7 ft. 6 in., and required 3200 hours to build.

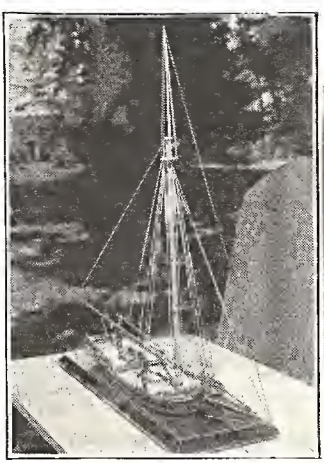


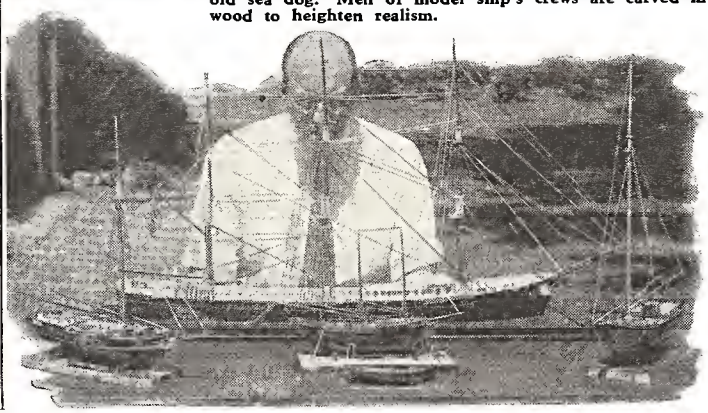
View of steam gauge, furnace door, control levers.



View here shows 10-inch drivers on Mr. Holt's model. Cylinders are 3 by 3½ in., working pressure is 90 pounds. Real headlights illuminate the track ahead and a real safety valve takes care of excessive pressure.

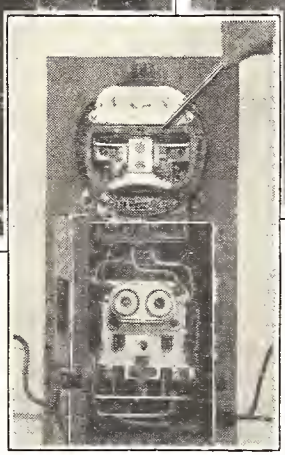
Here the helmsman is seen at his post at the tiller of the Thames hay barge. He has all the characteristics of an old sea dog. Men of model ship's crews are carved in wood to heighten realism.



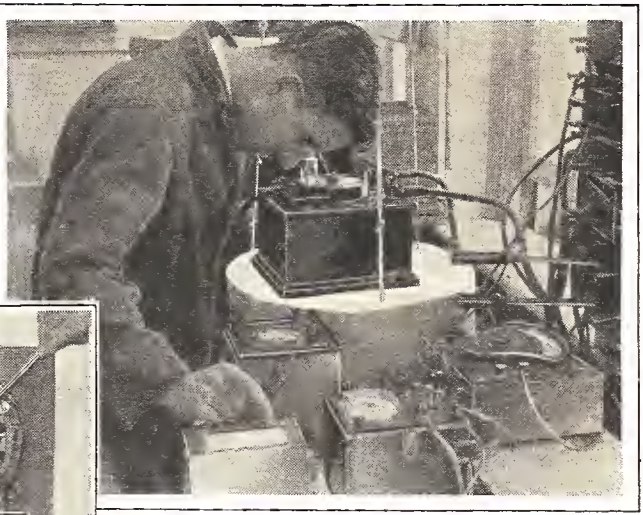


G. H. Howes, of Stamford, Conn., with his beautiful scale model of the famous Benjamin F. Packard. Every article on the ship was made to exact scale, then properly placed in position, resulting in a perfect replica. At left is seen a model Thames hay barge made from shipbuilder's drawings, a part of Mr. Howes' fine marine model collection.

How Light Companies Trap Power Thieves



Power thievery is quickly and easily detected by meter readers, and when an offender is caught it's lights out—no excuses accepted. At right is seen standard meter and switch. The pencil points out rotating disc.



Above is seen electrician at light company adjusting meter to insure closest accuracy in measurement of power consumption. Modern standard house meters are fool-proof.

"WE'RE sorry, madam, about the electric lights. Our meter reader found some wires connected ahead of the meter indicating that electricity was being stolen. Consequently, we have turned off your power and will remove the meter tomorrow. The final decision will rest with our legal department. Good bye."

The Supcrintendent paused and glanced at the service reports under his hand. This was the sixth case of power thievery reported in one week. "People will never learn that they can't steal power and get away with it," he said.

More than four hundred cases of power thievery occur annually in dwelling houses alone which are supplied with electricity by a large midwestern power and light concern. Over half of these attempts to steal power are made by housewives trying to reduce their monthly light bill.

The old-style meters had two easily accessible connecting screws where a piece of wire could be inserted. The effect was to short-circuit the coil which caused the disk to rotate and thus reduce the speed, or, actually reduce the number of kilowatt hours indicated on the dials. This trick has had many disguises, but invariably the would-be saver gets caught.

One man was found to have several brooms leaning up against the meter board and when the meter reader made his monthly visits the man or his wife would go down to the basement and casually remove a large push-broom which always rested on the meter. The meter reader examined the surfaces of the connecting screws and found blackened pits in the surfaces where the sparking shunt had burned tiny dents. He examined the push-broom and discovered a wire shunt hidden in the bristles.

Bricks, stones, magnets, ashes, chains, coils of wire, dry cells, and even huge blocks of cement large enough to crush the meter have been placed or hung on electric meters with the hope that they will slow down. All of these schemes are simply wasted effort.

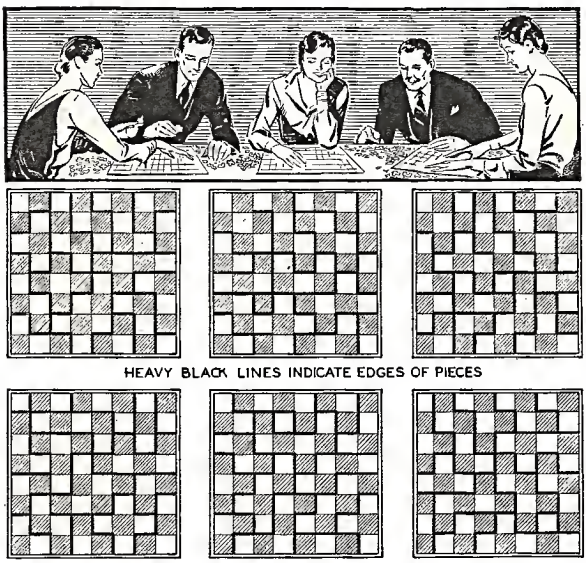
Radio enthusiasts rank next to overly thrifty housewives as power thieves. They usually understand simple electrical circuits, and feel confident that they can tap the incoming line ahead of the house switch.

In one case the meter man pulled the switch and the radio upstairs continued to play. When confronted with the evidence the family professed total ignorance of the connections and the blame was finally laid on the boy radio amateur of the house. Excuses don't work with most companies; they immediately remove the meter.

Modern engineering practice has developed fool-proof meters which rotate faster when a shunt is used. They are so well protected from outside magnetic disturbances that a huge, powerful magnet will not slow them down. The rotating disk is supported on sapphire bearings, and is so constructed that the least possible rotation continues after the current has stopped flowing through the coils.

HANDIKINKS

In this department you'll find each month ideas for saving labor, time and money. This month we start off with a page of stunts on the jig-saw puzzle craze that has recently swept the entire country.



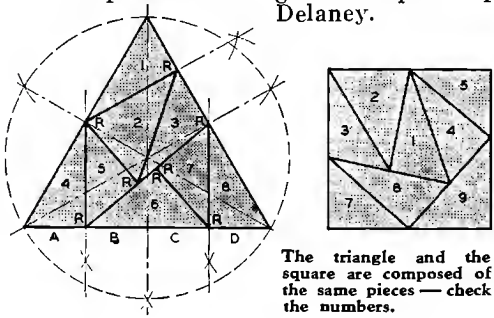
Checker-board Jig-saw Puzzle

A VARIATION of the popular jig-saw puzzle which at first glance seems absurdly simple but which actually is "anything but," is the checkerboard cutout shown at the left. Several different cutout patterns are shown, indicated by heavy black lines. Purposely the squares forming the border of the checkerboard are indicated with double lines. Otherwise you might spend a week or so getting the thing together. These puzzles can be cut out of plywood with a jig-saw, or the pattern can be laid out on a piece of fairly thick cardboard and the cuts made with a sharp chisel or razor blade. In case a jig-saw is used it is well to drill an eighth-inch hole in the corners where the saw blade must make a right angle turn. Eight by eight in. is suggested as a convenient size for general use.—Dick Cole.

"Squaring the Triangle" Puzzle

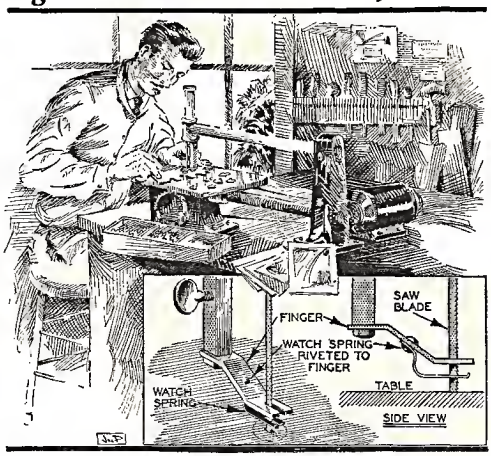
BELOW is an interesting little puzzle which can be made in a few minutes' time, at practically no cost. On a piece of stiff cardboard lay out an equilateral triangle as shown. Cut it into eight pieces with a sharp razor blade, following the geometrical layout given. The pieces composing the triangle can then be rearranged into a perfect square.

In the drawing, "R" indicates a right angle, and the figures are for identification of the pieces. The puzzle can be made more confusing if the figures are jumped around out of rotation, instead of being in order, as in the sketch. A little joker can be injected into the game if the puzzle is made from cardboard the same on both sides, and one piece numbered on the reverse side and presented to the puzzler wrong side up.—Ralph Delaney.



The triangle and the square are composed of the same pieces — check the numbers.

Jig-saw Kink Saves Time, Labor

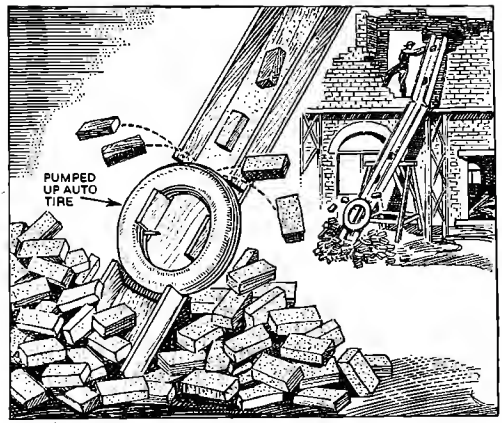


ABOVE is shown a species of workshop crank that has flowered prolificly over the country the past winter; he is a jig sawyer who cuts out puzzles of plywood on a jig-saw. He has a hard time keeping the work from jumping if his saw guide is too high above the work, and cannot turn it freely if too close. Tell him to put a watch spring under the saw guide. See drawing for an explanation of the method. It will save him much time and will speed his work immeasurably.—Walter Brixius.

Simple Stunts for Everyday Work

Rubber Tire Saves Salvaged Bricks

THE picture to the right is not a drawing of a scene in the recent California earthquake. It shows a method of buffing falling articles in a chute conveyor. A rubber tire is inserted in the sides of the chute the way the drawing shows, and bricks, canned goods, glassware and other items that are normally conveyed by chute can thus be saved from so much impact at the bottom of the fall that much material can be salvaged. This stunt is a good one for building contractors who must salvage the material they buy in wrecking a building.—R. A. Neiss.

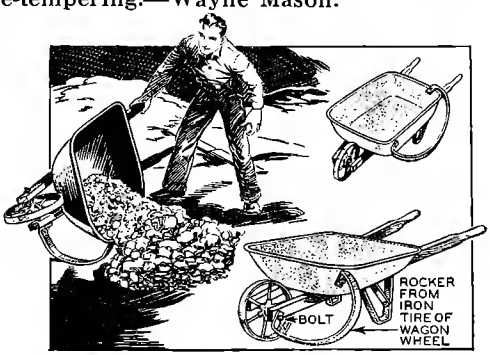


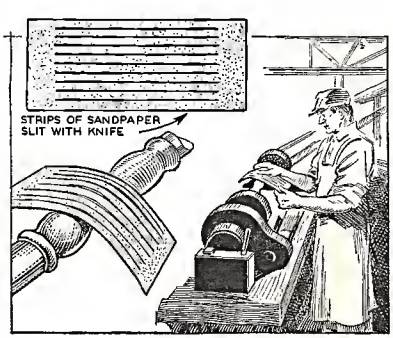
Salvaging Old Shingles in Buildings

SHINGLES may be removed from the side or roof of a building by using a carpenter's punch large enough to fit over the nail head. Hit the punch a light blow with the hammer, just enough to cut through the shingle. This leaves the nails free, and will save 8 to 10 inches of the butt of the shingle. These shingles so salvaged are useful again. This method has been proved by Virgil Wilson, of Seattle, who says that shingles can be taken off as fast as they can be put on. The punch is made by annealing a regular thick nail set, drilling the end while held in a vise, and then sharpening after re-tempering.—Wayne Mason.

Rocker Eases Wheelbarrow Dumping

WHEN dumping a wheelbarrow it takes considerable effort to empty the entire contents, especially if it is heavy wet dirt. To eliminate this trouble, a rocker was made from part of the iron tire of a wagon wheel. One part was fastened to the wheelbarrow and the other part bolted to the body. When dumping it can be easily rocked over on its side. If desired the rocker can be unfastened at the axle and turned back out of the way. Immense effort saved greatly reduces fatigue of the worker.—Leon Killian.

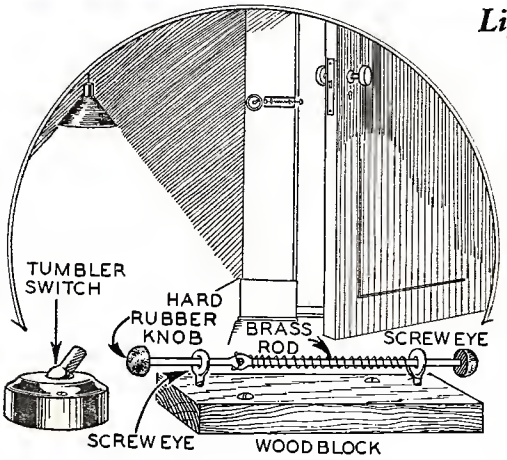




New Kink for Sanding Turned Legs

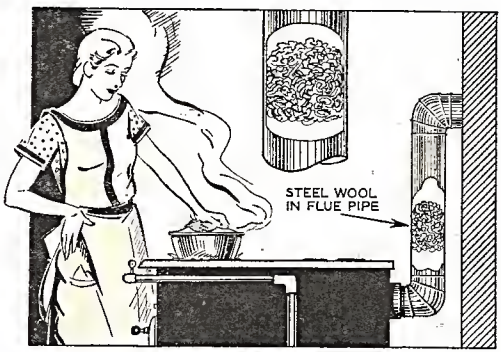
WHEN sanding turnings in a lathe the work may be accomplished more easily and effectively if the strip of sandpaper is first cut with a razor or a knife as shown in the drawing off to the left, according to G. E. Hendrickson, of Argyle, Wis. This allows the narrow strips of paper to be drawn into the deeper cuts of the wood, producing a more uniform sanding job. This will do away with the oft found fault of wood turnings—that of finding a perfectly chiseled turning worked down to odd diameters through the over zealous use of flat sanding paper. —G. E. Hendrickson.

Light Robot Cuts Your Electric Bills



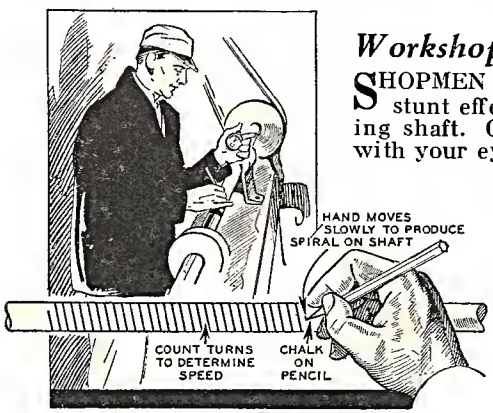
FORGOTTEN cellar lights have a way of boosting electric bills. This robot, however, will keep them turned off. A piece of stiff brass rod is flattened and then punched to take the end of a light coil spring. The other end hooks around the forward screw-eye, as illustrated in the drawing. Two small pieces of rubber, cut from thread of old auto tire, act as bumpers. The completed robot is then mounted in such a position that the closing of the door forces the bumper over far enough to snap the handle of the tumbler switch over to the other side and thus turn off the light. The switch, of course, must be turned on by hand when you go down into the cellar. The robot turns it off.—E. L. MacFarlane.

Steel Wool Holds Heat in Gas Range



A DOUBLE hand-full of steel wool placed loosely in the flue pipe of a gas cooking range, as illustrated at the right, acts as a filter and holds the heat in the oven. The steel wool serving as a filter, catches the grease vapor passing through the pipe and prevents grease accumulations usually found around the flue hole of a gas cooking range. The filter should be renewed every two or three months, or when it gets saturated with grease and soot.—Ray J. Marran.

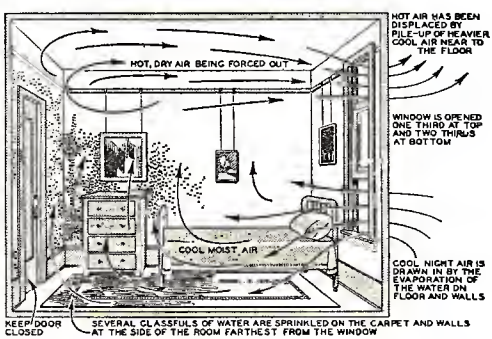
Workshop Kink for Finding the Speed of Shaft



SHOPMEN minus a revolution counter will find this stunt effective for obtaining correct speed of a revolving shaft. Choose a clear stretch of shafting, and then, with your eye fixed on the second hand of a watch, touch a piece of chalk to one end of the shaft. Gradually move the chalk along so as to produce a spiral, as illustrated in the drawing. Then just as the second hand completes a minute, remove the chalk. Stop the shaft and count the turns in the spiral. Naturally the number of turns made during the minute will be the r.p.m. of the shaft, within very few turns. Lastly erase the chalk marks off the shaft.—Little Handy Andy.

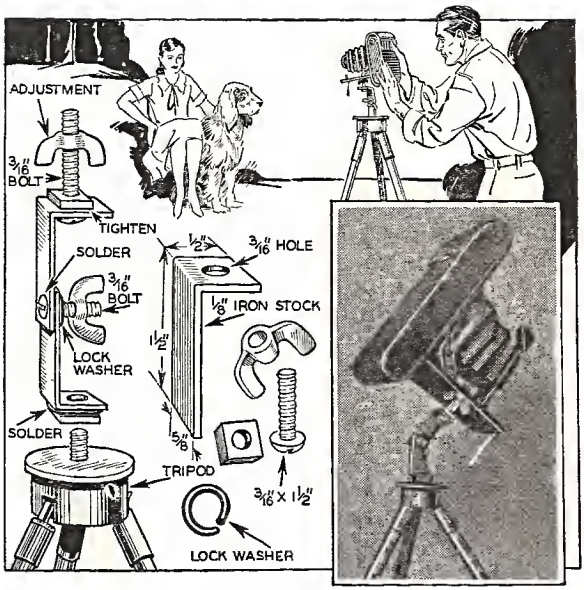
Keeping Cool in Hot Bedroom

ROOMS lacking in cross ventilation can be made much more comfortable for sleep by simply sprinkling several glassfuls of water on the carpet or floor and opening the window one-third at the top and two-thirds at the bottom. The evaporation of the water goes on rapidly, cooling the room considerably. Cold air is sucked in the bottom of the window and hot, dry air is discharged out the top. The door should be shut so that the temperature drop is confined to the room.—Weston Farmer.

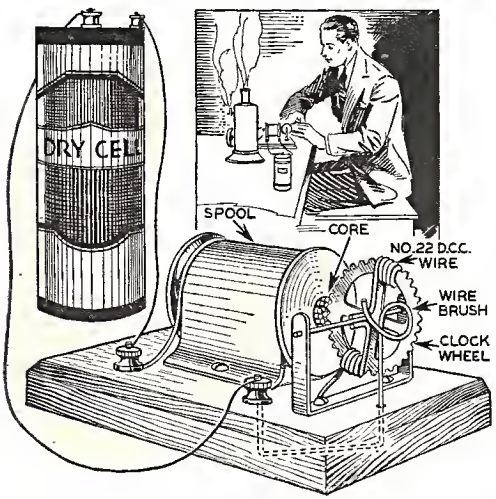

HOT AIR HAS BEEN DISPLACED BY PILE-UP OF HEAVIER COOL AIR NEAR TO THE FLOOR
HOT, DRY AIR BEING FORCED OUT
WINDOW IS OPENED ONE THIRD AT TOP AND TWO THIRDS AT BOTTOM
COOL MOIST AIR
COOL NIGHT AIR IS DRAWN IN BY THE EVAPORATION OF THE WATER ON FLOOR AND WALLS
KEEP DOOR CLOSED
SEVERAL GLASSFULS OF WATER ARE SPRINKLED ON THE CARPET AND WALLS AT THE SIDE OF THE ROOM FARTHEST FROM THE WINDOW

All-Angle Tripod Attachment

THE amount of tilting permitted by the adjustable legs of the ordinary camera tripod is quite limited. Often it is desired to tilt the camera up or down a bit to get certain effects in the picture. The simple little gadget shown at the right, attached to the tripod, solves this problem. Its construction is self-explanatory, a nut whose threads match the tripod screw being soldered to the base for attachment. After the camera is screwed on, the wing nut is tightened to prevent it from turning of its own weight. Another wing nut is tightened to hold it at the desired tilt. A 3/16-inch nut is the size which accommodates the standard tripod screw. All the equipment needed to manufacture one of these devices is a drill to put the holes through the metal. The standard nuts, bolts, and wing nuts do the rest of the job.—Jared Steele.



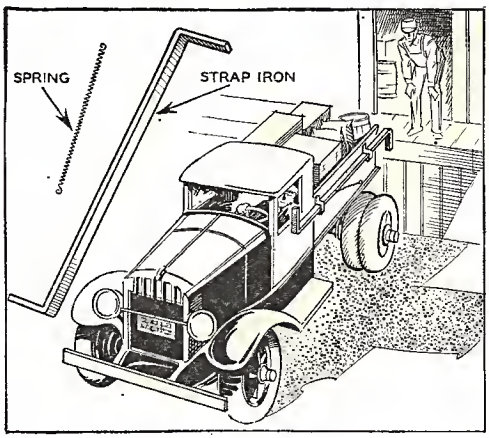
Tiny Motor Has Real Power



ABOUT the simplest thing yet in the way of a toy motor—and a motor which actually runs—is illustrated above. "Juiced" by a single dry cell, it will turn over at a neat clip. The field coils are scramble wound on a common spool and mounted as shown. The core consists of a bunch of iron wires inserted in the center of the spool. As for the armature, you can see for yourself. One end of each armature coil ends in a bare wire which is contacted by the brush, while the other end solders to the shaft. As the shaft turns, juice is fed to the coils through the brush, and the coil immediately makes for the core. The brush then cuts in the lower coil and the cycle begins all over again. —Frank Nazzey.

Simple Test for Vision Defects

A ROUGHLY accurate test for acuteness of vision is provided in the row of dots in the drawing below. Hold the page 10 inches from your eyes, and without any other aid count the dots from left to right, then from right to left, in eight seconds' time. Do you get the same total? Close the left eye. Place a pencil mark between the eighth and ninth dots from the left, within two seconds. Open left eye, close the right, and in three seconds place a mark between fourteenth and fifteenth dots from the right. Then check results.—V. E. Barnes.

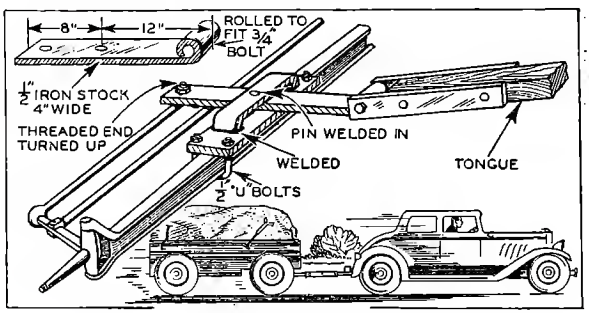


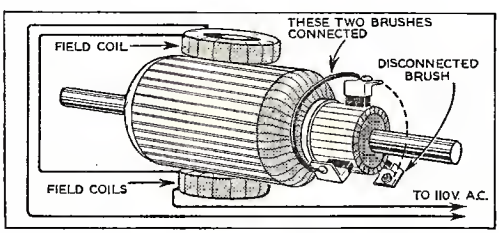
Handy Back-up Indicator for Truck

WHEN backing up a truck the driver is often at a loss to know just how close to the loading platform the rear of the truck body is. The contraption shown in the drawing at left will remedy this situation. A strip of bar iron of the required length is mounted in a pair of U-shaped slides on the side of the truck. One end of the strap iron bar should protrude out about a foot beyond the end of the body, while the other end rests before the cabin window. When the iron strip strikes the platform it is driven ahead against the tension of the spring, showing the driver he is about in the right unloading position. Such a contrivance will eliminate the necessity of having a helper signal to you your position relative to the platform. —James Nelson Davies.

Steering Wheel for Trailers

THE front axle of an old Ford will provide excellent steering facilities for your trailer on the road this summer. How the parts are assembled is illustrated in the drawing at the right. The tongue pivots in a special attachment on the axle, so that when the towing auto turns a corner the front wheels of the trailer are automatically steered to the correct side. In drawing note special rod which connects tongue with steering pin on the axle.—A. Hobbes.



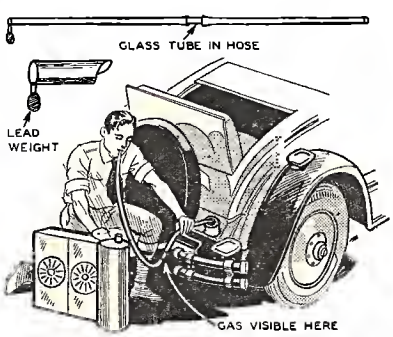


Auto Generator Makes A.C. Motor

AN OLD 6-volt auto generator of the three-brush type can easily be converted into an ⅛ h.p. 3,000 r.p.m. motor. Here's how it's done. Remove the armature and disconnect the three field leads from the brushes. The one that goes to the terminals of the generator is removed, and the two remaining wires are connected together. Connect the field coils of the generator to the 110-volt A.C. line, making sure the field is continuous. Now replace the armature and assemble the generator. Connect the movable or third brush to one of the other two then turn the current on again. If the motor does not run connect the brush lead to the opposite brush, which should operate the motor. Adjust the movable brush back and forth until the motor runs at its highest speed. A small fan mounted on the armature shaft will cool the motor if it has a tendency to heat at high speeds. —Peter Taras.

This Hose Makes Siphoning Gasoline Easier

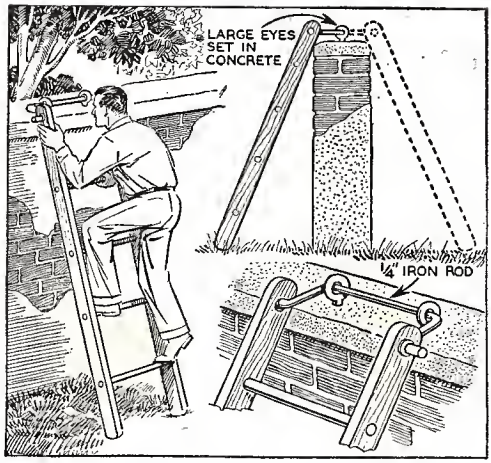
SIPHONING gas from your auto in a can is a much easier job with this little gadget. A long rubber hose is cut in two and the middle ends are worked over a 3-inch section of glass tubing. On the end, as illustrated in the drawing, is attached a lead weight to draw the tube down to the bottom when it is inserted. When the gas is sucked up the tube to start the siphon, the glass tube in the center will show just how far the liquid has progressed in its journey toward your mouth. Such a scheme can also be used for siphoning from large carboys.—Erich Nussbaum.



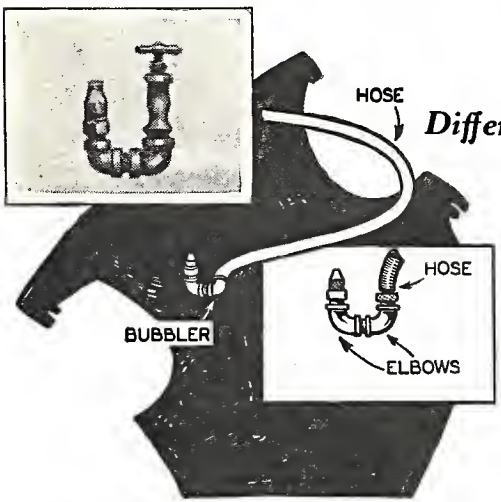
Labor-Saving Outdoor Stunts

Cross High Wall on Ladder Step

HERE'S a new and extremely convenient way to negotiate a high garden wall. Obtain a ladder whose height is slightly greater than that of the wall and in the ends bore holes to take ¼ in. iron rod. Incidentally, as illustrated in the drawing, this rod passes also through two large eyes set in the top of the wall. When you want to cross, you simply climb to the top, swing the ladder over to the other side and descend. When you return reverse the process.—Amos Devare.



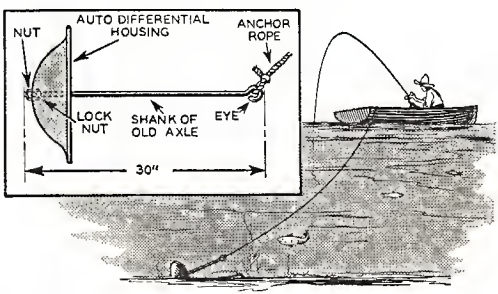
Impromptu Fountain Is Waterboy

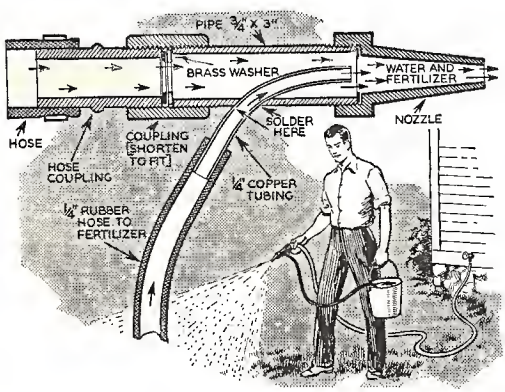


AN IMPROMPTU drinking fountain can be rigged up from a couple of elbows and two short pieces of iron pipe. These should be assembled in the manner illustrated above, and the hose should be attached in the usual place. With this contrivance in use, a water boy on a construction job can take it easy. The fittings can easily be obtained at any plumbing supply shop.—John E. Mason.

Differential Housing Makes Boat Anchor

FOR soft anchoring bottoms, the mushroom type anchor proves ideal. Such an anchor can be made by securing an old differential housing and drilling a hole in the center to take a length of axle shafting as illustrated in the accompanying drawing. Thread one end of the shaft and bolt it in place as shown, then heat the other end so it can be forged into an eye. The anchor rope is finally tied into the eye, and it is ready for duty. It's just as good as a manufactured article, and it can't be beat for holding power. Just toss it overboard and forget it.—L. B. Robbins.

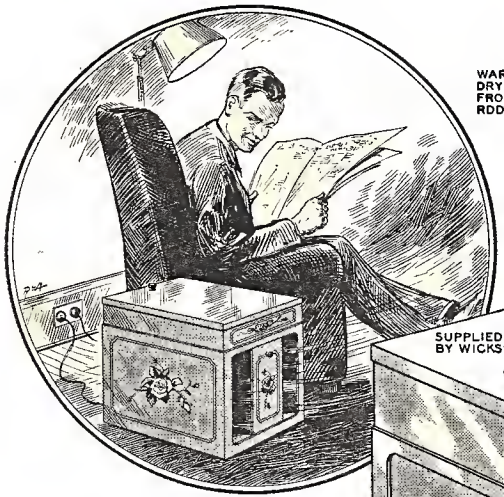




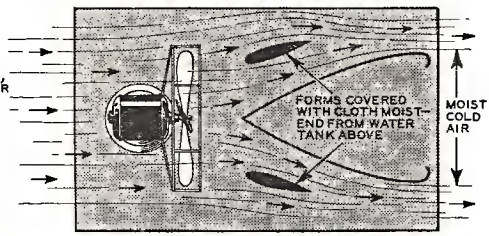
Nozzle Sprays Garden Fertilizer

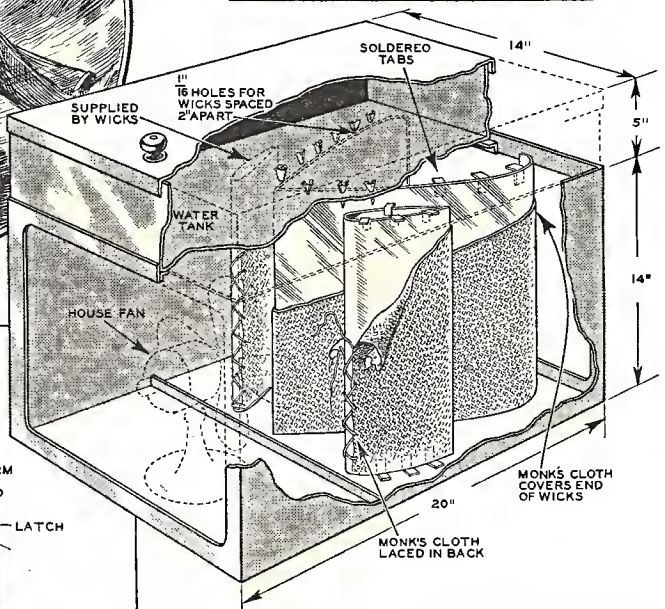
LAWN or garden fertilizer which is soluble in water can be easily and speedily applied with the specially constructed spray illustrated at the left. To operate, dissolve the fertilizer in a bucket of water, place the free end of the rubber tubing in the bucket and turn on the hose. The force of the water passing through the tubing will create a vacuum and suck the fertilizer up through the hose and spray it out through the nozzle. To regulate the flow of the fertilizer solution arrange a clamp on the rubber hose, or put a stopcock on the copper tubing.—Archie Amos.

Air Conditioner KEEPS ROOMS COOL

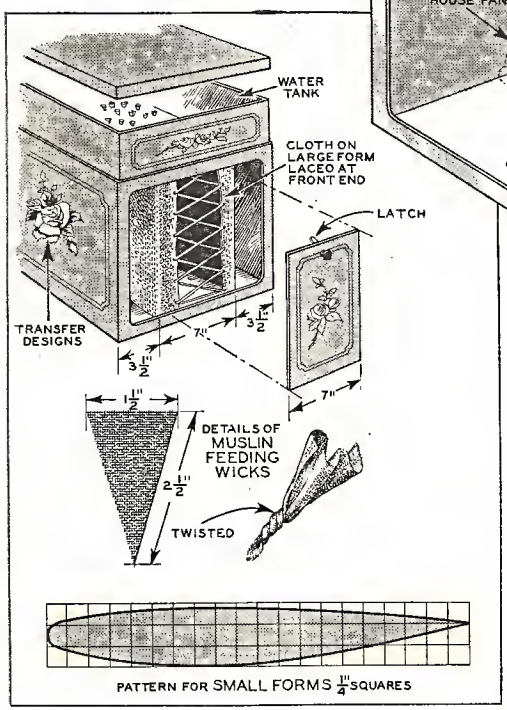


Air conditioner can be moved to any part of house to cool and moisten air.





Cut-away view here shows positions of large and small forms, which are covered with monk's cloth. Note position of fan which blows breeze over moistened cloth to cool air.



At top is seen door which conceals lacing on large form. Muslin wicks are cut to dimensions shown and twisted for insertion into the holes. From them water drips onto cloth.

THE fact that water, in the process of evaporation, absorbs heat, makes it possible to keep the inside of the house cool in hot weather by a simple device which forces air against a moist surface.

An ordinary house fan blowing against a damp cloth will produce the desired result, and herewith is a design for an air-conditioner which works on this principle. Dimensions are given above.

There are three forms, all, like the cabinet, made of galvanized iron, over which monk's cloth or similar wick-like material is stretched and fed with water from the tank above. The large central form has curved surfaces so that the cloth which is laced across the front will adhere to it at all points. Close to the upper edge 1/16 in. holes are drilled about 2 in. apart. Into these the wicks are drawn, to feed the water slowly onto the monk's cloth.

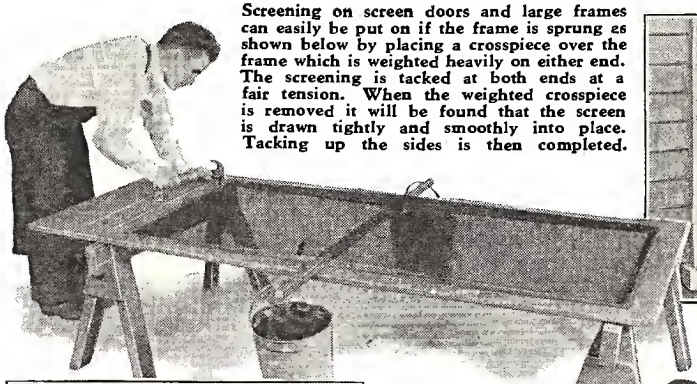
Over the lacing on the end of the wedge-shaped form is a removable panel with knob and latch as shown. Solder brass chair glides to hang the cabinet on.

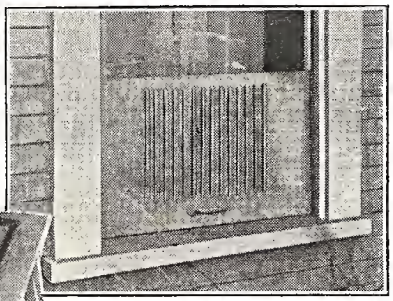
It is important to regulate the flow through the wicks so that the cloth surfaces will be moist but so that no excess runs down into the pan. When the cloth becomes musty it can quickly be exchanged for new.

The electric fan should be of 12-in. blade type, with a control rheostat hooked into the 110-volt circuit. The completed conditioner should be painted with brush lacquer to harmonize with the room.

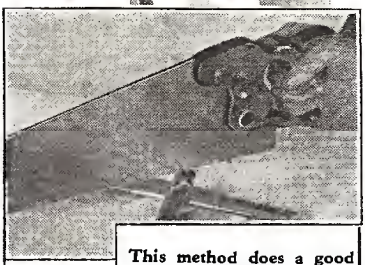
Practical Screening Methods

Screening on screen doors and large frames can easily be put on if the frame is sprung as shown below by placing a crosspiece over the frame which is weighted heavily on either end. The screening is tacked at both ends at a fair tension. When the weighted crosspiece is removed it will be found that the screen is drawn tightly and smoothly into place. Tacking up the sides is then completed.

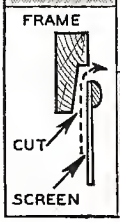




Cottage screens can be made from auto hoods; cover louvers with cloth.

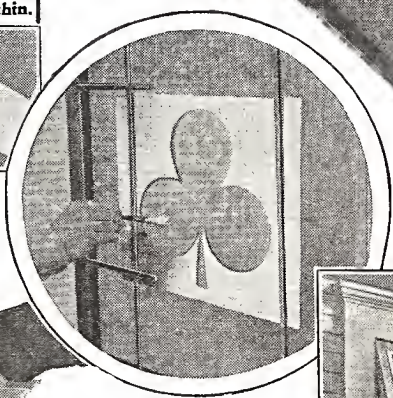


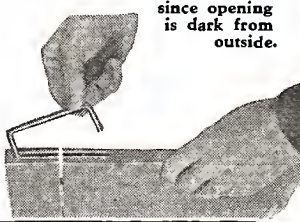
This method does a good job of mitering the molding. For best results the saw blade should be very thin.

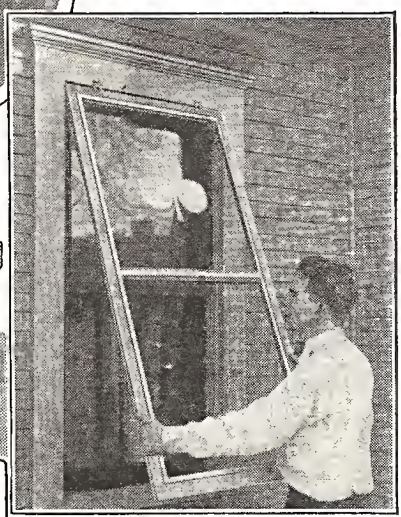


How to cut fly exit in frame. Flies move toward light, will not return since opening is dark from outside.

When covering several screens of the same size, place in a row, tacking at opposite ends of row. Wedges are driven into place to draw tight. At left, using a stencil to paint design on screen.

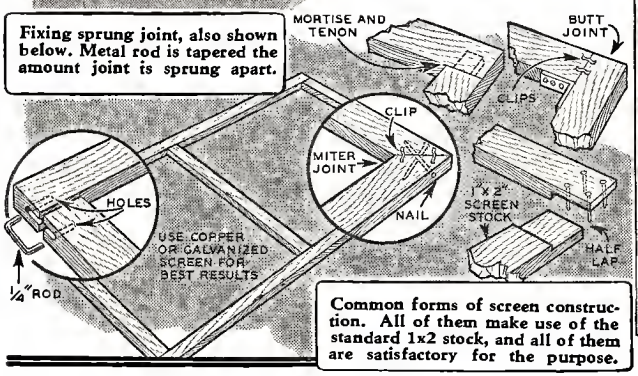






Hanging screen with a stenciled pattern.

Fixing sprung joint, also shown below. Metal rod is tapered the amount joint is sprung apart.



Common forms of screen construction. All of them make use of the standard 1x2 stock, and all of them are satisfactory for the purpose.

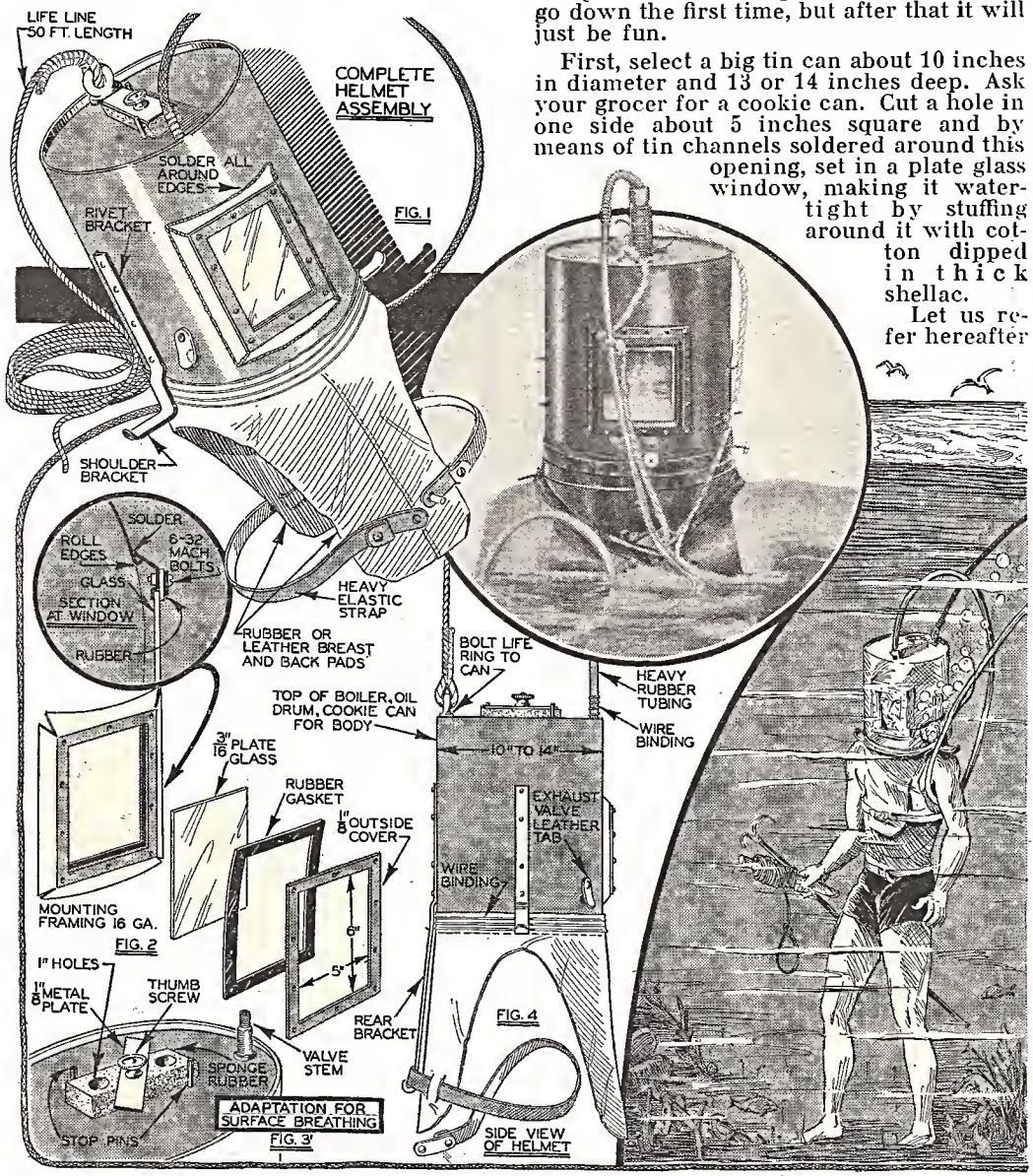
BUILDING a DIVING

Improvement follows improvement in the design of home made diving helmets as amateur divers become more and more acquainted with their use. This one of Hoag's is the last word in helmets so far published by good old M-M.

ALL the thrills of exploring the lake bottom are yours with this simply constructed diving helmet; and, if you do not dive too deep, you are in no particular danger, either. Besides its use in recovering lost outboard motors at a substantial profit, the helmet will give you one of the most interesting experiences of your life; for until you have breathed and walked at leisure under water, you have missed something. It will take a good deal of nerve to go down the first time, but after that it will just be fun.

First, select a big tin can about 10 inches in diameter and 13 or 14 inches deep. Ask your grocer for a cookie can. Cut a hole in one side about 5 inches square and by means of tin channels soldered around this opening, set in a plate glass window, making it watertight by stuffing around it with cotton dipped in thick shellac.

Let us refer hereafter



Inset photo shows helmet made from these plans. Upper left shows helmet completed. In diving, always keep head up to prevent water level from closing air intake valve. To pick anything up, stoop down. This keeps water level.

HELMET

by DOANE R. HOAG

to this window side of the helmet as the "front."

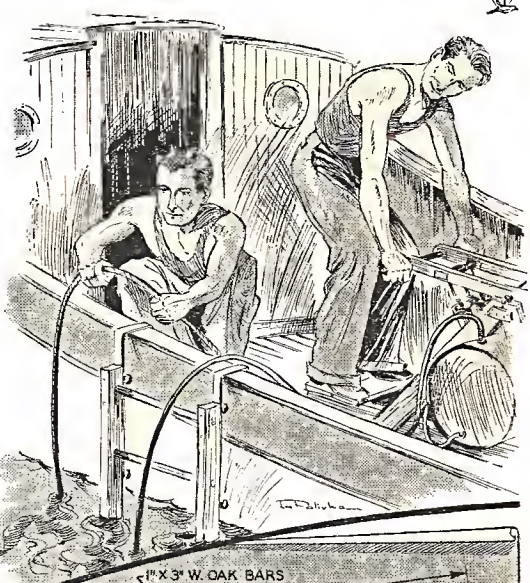
Now split an automobile inner tube and wrap this sheet of rubber around the lower edge of the helmet (the open end), lapping it over in front, and bind it to the can with a couple loops of baling wire, using a little shellac between rubber and metal to insure a watertight junction.

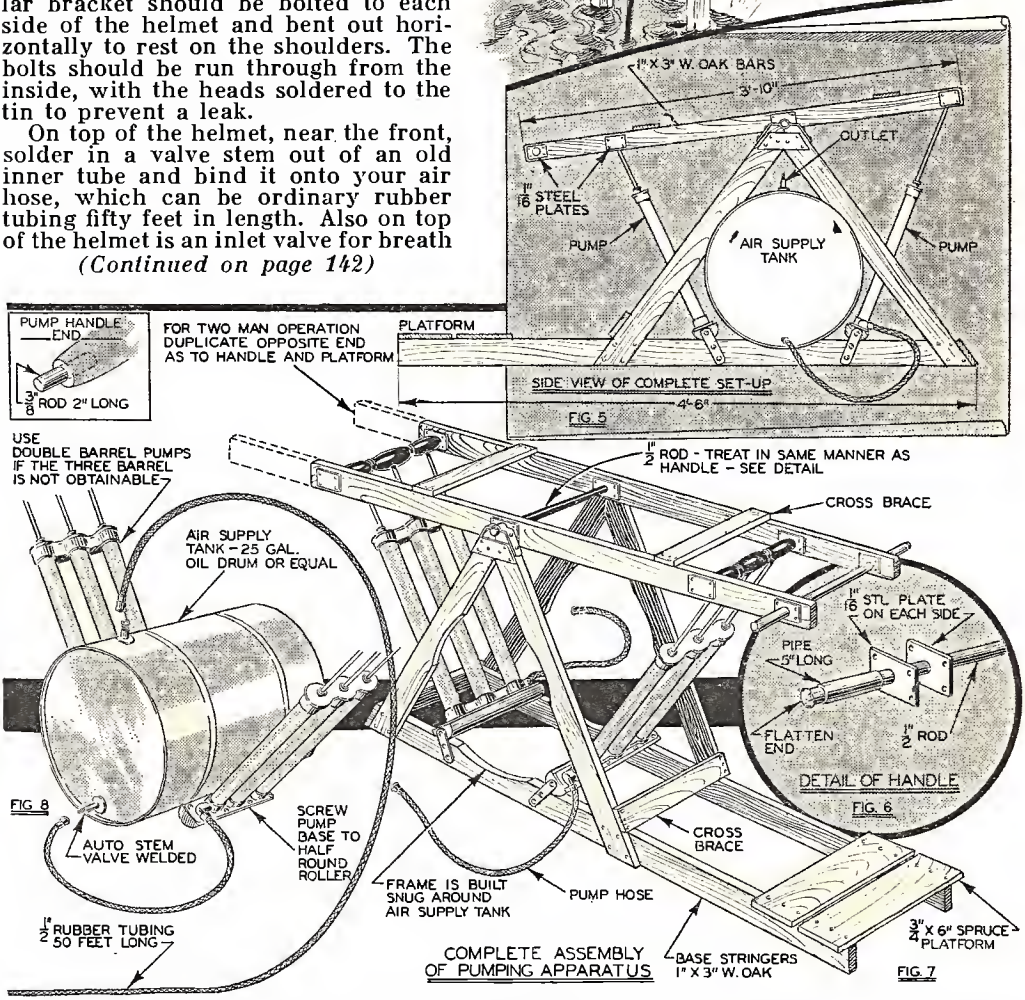
The rubber should then be cut away over the shoulders.

Next, bolt a 24-inch length of eighth-inch strap iron (say 1½ inches wide) to the back of the helmet to make the "rear bracket" in the drawing. A similar bracket should be bolted to each side of the helmet and bent out horizontally to rest on the shoulders. The bolts should be run through from the inside, with the heads soldered to the tin to prevent a leak.

On top of the helmet, near the front, solder in a valve stem out of an old inner tube and bind it onto your air hose, which can be ordinary rubber tubing fifty feet in length. Also on top of the helmet is an inlet valve for breath

(Continued on page 142)




1" X 3" W. OAK BARS
3'-10"
OUTLET
1/16" STEEL PLATES
PUMP
AIR SUPPLY TANK
PUMP
SIDE VIEW OF COMPLETE SET-UP
4'-6"
FIG. 5
PUMP HANDLE END
3/4" ROD 2" LONG
FOR TWO MAN OPERATION DUPLICATE OPPOSITE END AS TO HANDLE AND PLATFORM
PLATFORM
USE DOUBLE BARREL PUMPS IF THE THREE BARREL IS NOT OBTAINABLE
1/2" ROD - TREAT IN SAME MANNER AS HANDLE - SEE DETAIL
CROSS BRACE
AIR SUPPLY TANK - 25 GAL. OIL DRUM OR EQUAL
1/16" STL. PLATE ON EACH SIDE
PIPE 5" LONG
FLATTEN END
1/2" ROD
DETAIL OF HANDLE
FIG. 6
FIG. 8
AUTO STEM VALVE WELDED
SCREW PUMP BASE TO HALF ROUND ROLLER
CROSS BRACE
FRAME IS BUILT SNUG AROUND AIR SUPPLY TANK
PUMP HOSE
1/2" RUBBER TUBING 50 FEET LONG
COMPLETE ASSEMBLY OF PUMPING APPARATUS
BASE STRINGERS 1" X 3" W. OAK
3/4" X 6" SPRUCE PLATFORM
FIG. 7

Our engineer-artist, John Polivka, has designed this pumping and air reservoir system for the diving helmet. Be sure to pick out helpers at the pump who don't think it "funny" to quit when you are down below. Descend via anchor rope.

Air CAMPING

For diversion, Doug Rolfe gives us something to think about in considering air cruising—relaxation from our shop work.

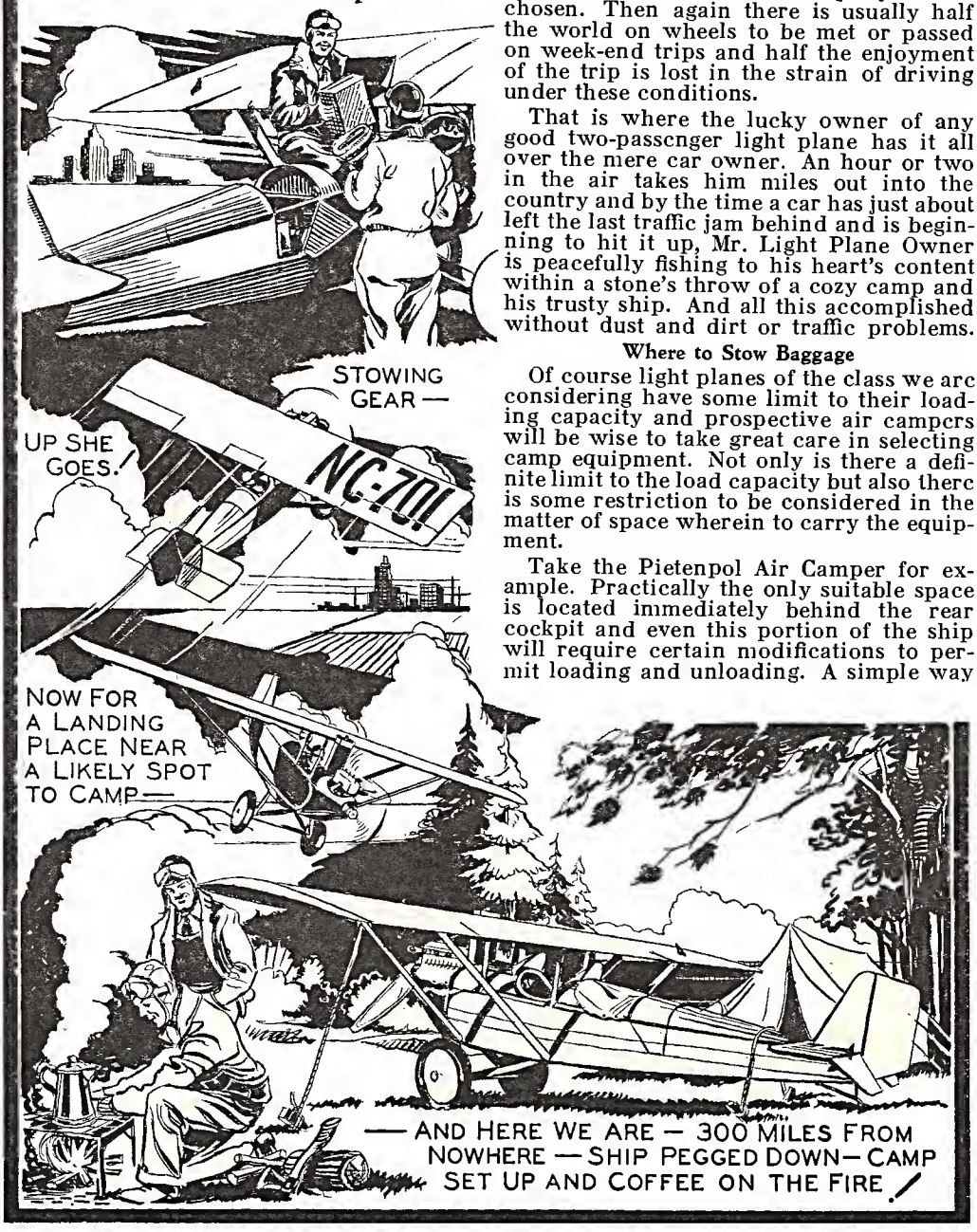
HOW many times have you fellows had the yen to go on a week-end camping trip? Plenty, it's safe to say. Trouble with week-end camping trips is that half the time has to be reckoned as road time getting to and from the secluded spot you have chosen. Then again there is usually half the world on wheels to be met or passed on week-end trips and half the enjoyment of the trip is lost in the strain of driving under these conditions.

That is where the lucky owner of any good two-passenger light plane has it all over the mere car owner. An hour or two in the air takes him miles out into the country and by the time a car has just about left the last traffic jam behind and is beginning to hit it up, Mr. Light Plane Owner is peacefully fishing to his heart's content within a stone's throw of a cozy camp and his trusty ship. And all this accomplished without dust and dirt or traffic problems.

Where to Stow Baggage

Of course light planes of the class we are considering have some limit to their loading capacity and prospective air campers will be wise to take great care in selecting camp equipment. Not only is there a definite limit to the load capacity but also there is some restriction to be considered in the matter of space wherein to carry the equipment.

Take the Pietenpol Air Camper for example. Practically the only suitable space is located immediately behind the rear cockpit and even this portion of the ship will require certain modifications to permit loading and unloading. A simple way


STOWING GEAR —
UP SHE GOES!
NC-701
NOW FOR A LANDING PLACE NEAR A LIKELY SPOT TO CAMP—
— AND HERE WE ARE — 300 MILES FROM NOWHERE — SHIP PEGGED DOWN — CAMP SET UP AND COFFEE ON THE FIRE!

IDEAS

by **DOUG ROLFE**

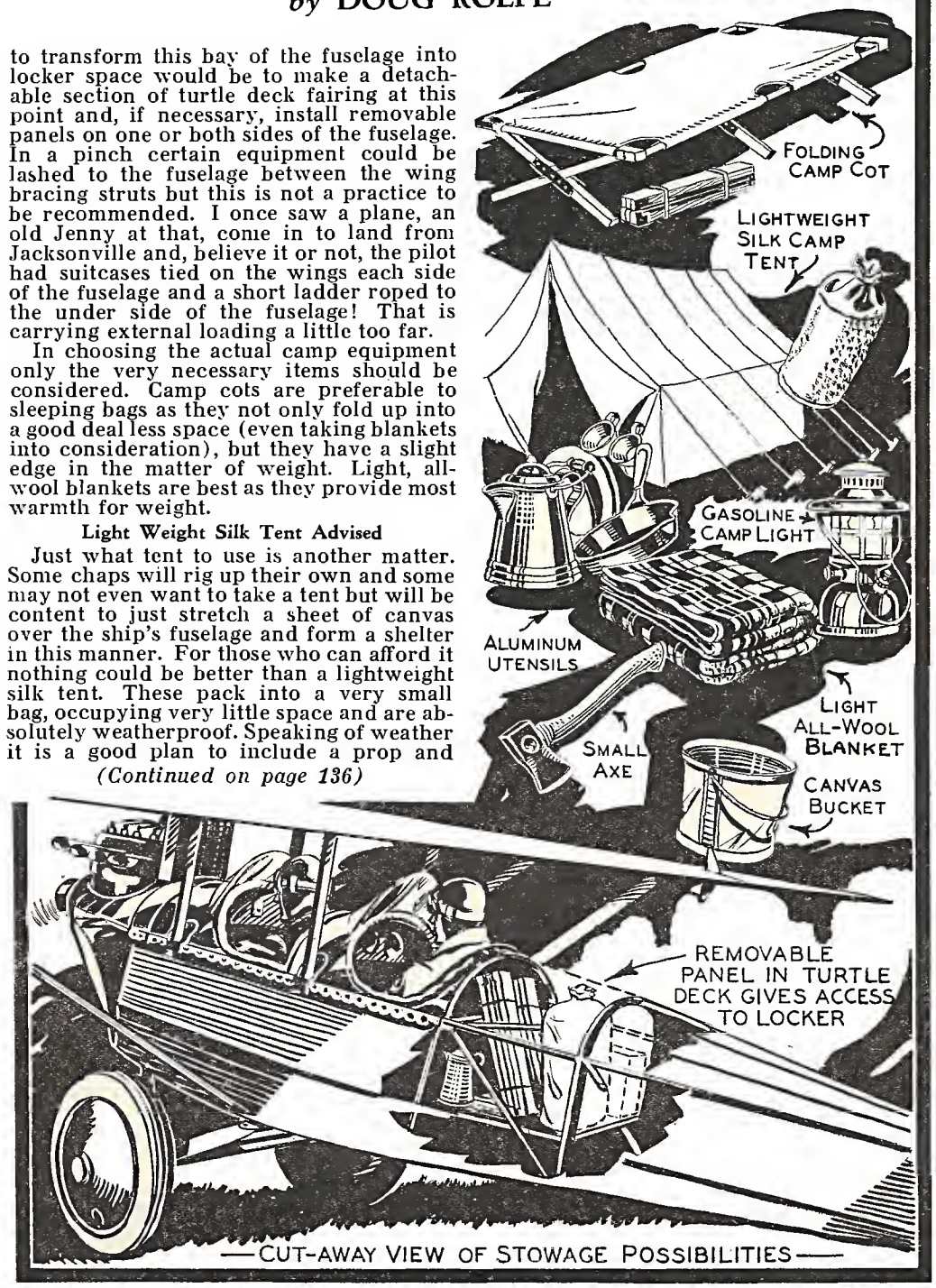
to transform this bay of the fuselage into locker space would be to make a detachable section of turtle deck fairing at this point and, if necessary, install removable panels on one or both sides of the fuselage. In a pinch certain equipment could be lashed to the fuselage between the wing bracing struts but this is not a practice to be recommended. I once saw a plane, an old Jenny at that, come in to land from Jacksonville and, believe it or not, the pilot had suitcases tied on the wings each side of the fuselage and a short ladder roped to the under side of the fuselage! That is carrying external loading a little too far.

In choosing the actual camp equipment only the very necessary items should be considered. Camp cots are preferable to sleeping bags as they not only fold up into a good deal less space (even taking blankets into consideration), but they have a slight edge in the matter of weight. Light, all-wool blankets are best as they provide most warmth for weight.

Light Weight Silk Tent Advised

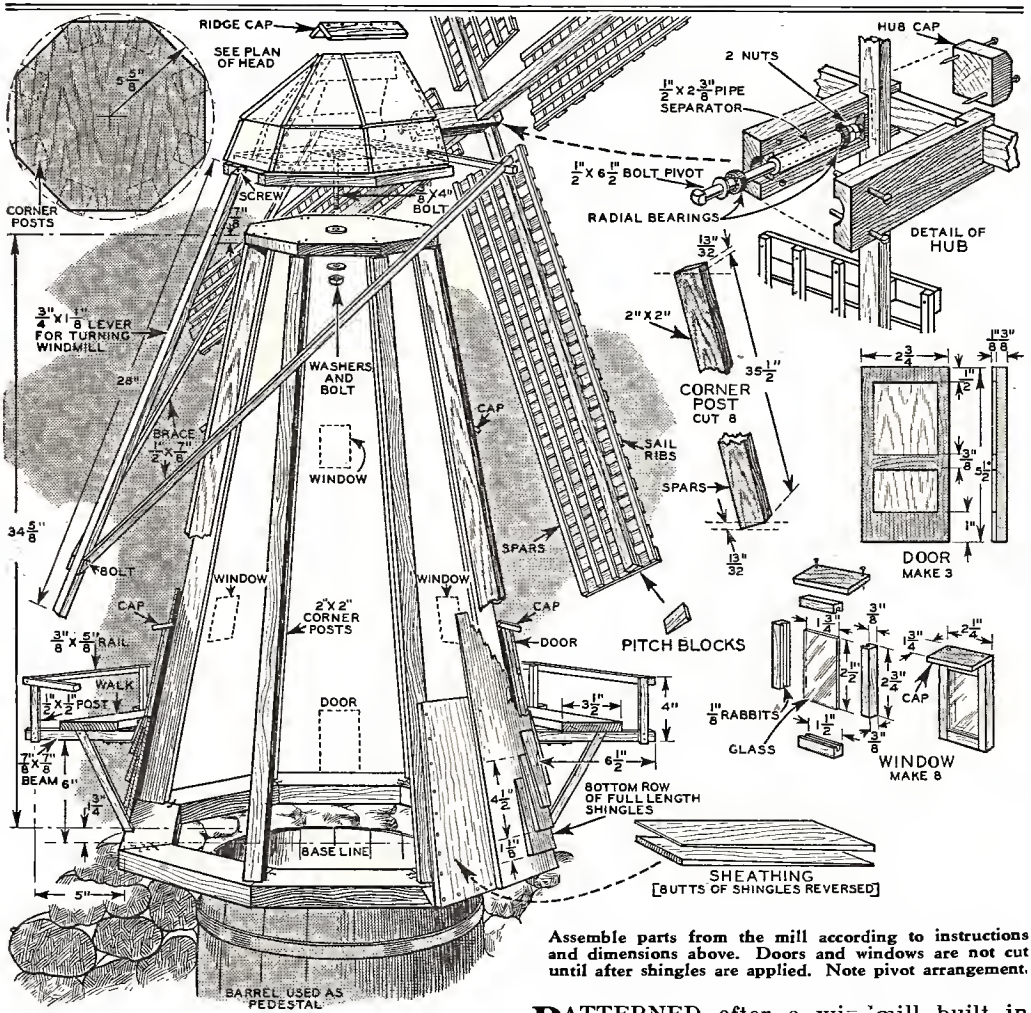
Just what tent to use is another matter. Some chaps will rig up their own and some may not even want to take a tent but will be content to just stretch a sheet of canvas over the ship's fuselage and form a shelter in this manner. For those who can afford it nothing could be better than a lightweight silk tent. These pack into a very small bag, occupying very little space and are absolutely weatherproof. Speaking of weather it is a good plan to include a prop and

(Continued on page 136)

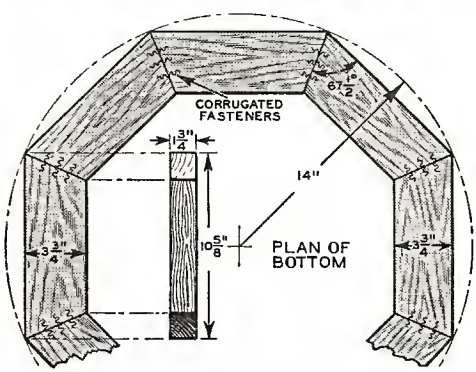


—CUT-AWAY VIEW OF STOWAGE POSSIBILITIES—

Model DUTCH Windmill



Assemble parts from the mill according to instructions and dimensions above. Doors and windows are not cut until after shingles are applied. Note pivot arrangement.



Start model by making a full-size layout of the tower bottom frame, shown above. Then cut out segments and place on layout to get correct shape. Note that pieces are secured together with corrugated fasteners. Corner post ends are cut with 13/32 in. pitch to give proper slant to sides and toenailed in place. Note how frame rests on barrel.

PATTERNED after a windmill built in 1847, this model makes an attractive and strikingly unique ornament for your rock garden or your front lawn.

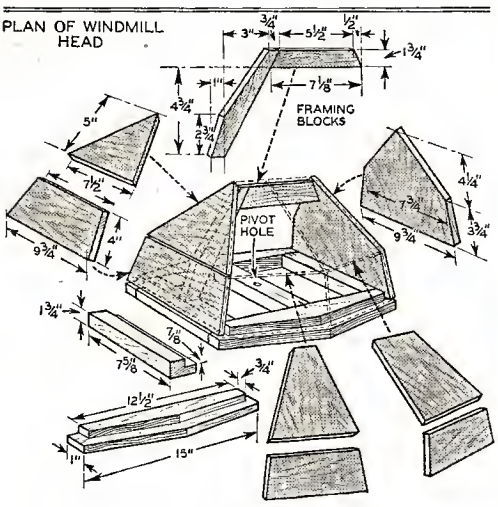
The corner posts are 2-by-2's, 35½ in. the tower bottom frame, as shown at the left. Then cut out and assemble the segments as directed.

Construction is surprisingly simple. Start the model by making a full-size layout of long, trimmed 13/32 in. from each end to give proper pitch to the sides.

Lay out the octagonal top on a piece of 1-by-12 board, and cut it out. Then toenail the corner posts in place.

In shingling, only the thin ends of the shingles are used. These are cut down 4½ in. long and 2 in. wide. Full length shingles form the bottom row. For sheathing, place two shingles together as illustrated. Leave the cutting of doorways and windows to the last.

Decorates Rock GARDEN



Cut all blocks for head according to dimensions given here. Then shingle completed top as in the case of the house. Assemble all parts with corrugated fasteners.

Plans for the windmill head are given in the drawing above. Assemble all the blocks with corrugated fasteners. Note particularly the pivot hole. Shingle the roof with the same size shingles used on the tower sides.

The windmill hub is built up of three blocks as illustrated in accompanying drawings. It is essential here that plenty of grease be provided for the bearings.

Now for the sails. Notice how the spars pass through the hub. This is important since there will be a slight variation in the weight of the sails no matter how carefully you select the strips.

Cut two pieces of 1-by-2 30 inches long for the sail spars. Rip the lattice strips in half for the sail ribs and rib bands and cut 76 pieces 7¼ in. long for the ribs and 16 pieces 25⅜ in. long for the rib bands.

By careful ripping and smoothing the strips should measure a full ⅝ in. in width. Cut several blocks ¾ in. wide for spacers and then assemble the sail frames as shown.

The sails are mounted on the blocks with wedge shaped blocks set as illustrated. When you have assembled the sails, slip the spars into the hub block recess, and adjust them till they balance. Mark the positions, but do not fasten the spars at this time, as you will want to remove them for painting.

Finally, finish the shingles with a coat of creosote shingle stain, also the platform and its railing, the beam and the supports, and the hub and the cap. Finish the window sash and doors, and the sails with two coats of white paint.

When dried, slip the sails into their recesses in the hub, and fasten with screws. Then screw the hub cap in place.

The completed model Dutch mill in action in a rock garden.

Alcohol Stove for Workshop

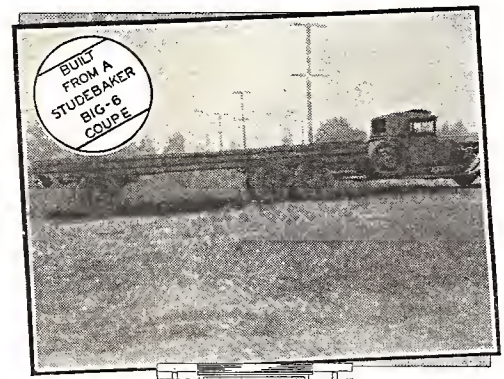
A HANDY article that will find many uses around any home or shop is a small alcohol stove. A very serviceable one can be made in a few minutes' time from a small glass bottle, and a medium sized tin can.

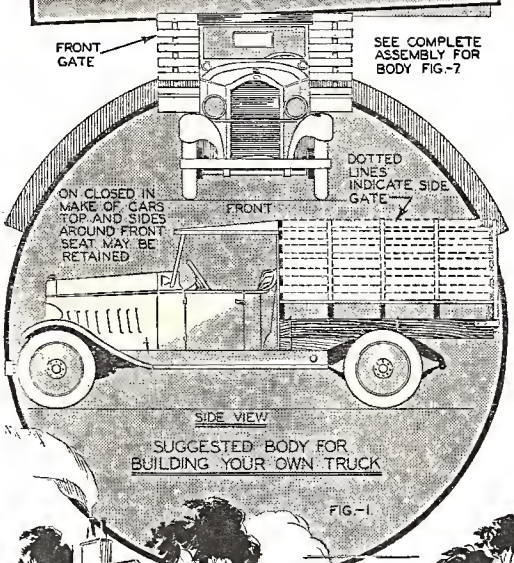
The accompanying photo illustrates construction of the stove. Part of the side of the can is cut away as shown to allow the bottle lamp to slide under. Select a short, thick bottle, preferably with a screw cap. Cut in the top of the cap, a slit the width of the wick you are to use. Make a collar of tin, and solder this on to prevent the flame from heating the cap too hot.

Wicks may be obtained anywhere, and are inserted in place with the fingers, pulling it through just far enough to burn correctly. Round wicks may also be used.

Portion of can is cut away, and a stove burner is set in place.

How to BUILD YOUR




FRONT GATE
SEE COMPLETE ASSEMBLY FOR BODY FIG.-7
DOTTED LINES INDICATE SIDE GATE
CAN CLOSED IN MAKE OF CARS TOP AND SIDES AROUND FRONT SEAT MAY BE RETAINED
FRONT
SIDE VIEW
SUGGESTED BODY FOR BUILDING YOUR OWN TRUCK
FIG.-1

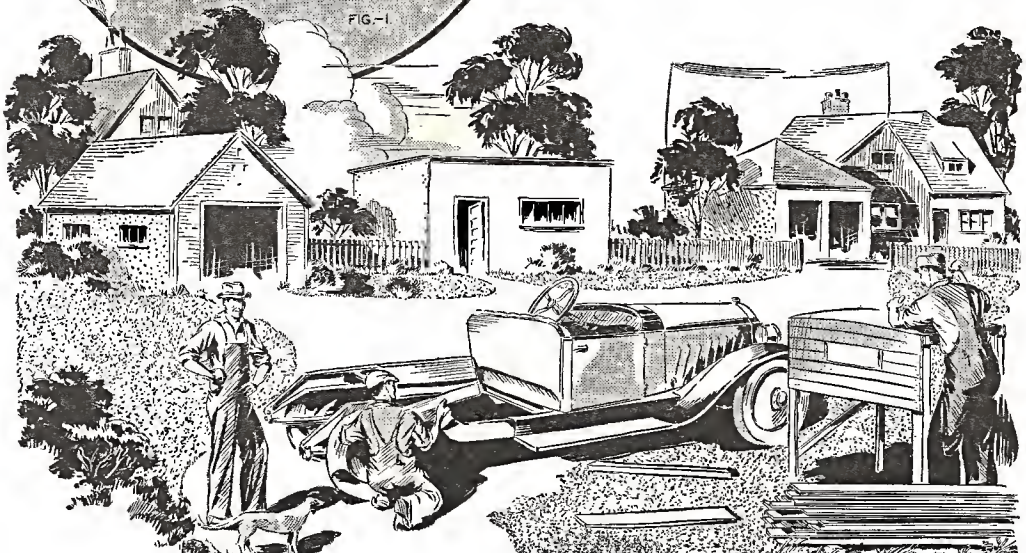
Economies discovered by the depression are responsible for a lot of worthwhile ideas. Here's a dandy for the man who wants to make his car earn money. Convert it into a light truck and set it to work. The article describes conversions.

MANY people have found escape from the depression in building small trucks from passenger automobiles and using them in selling various kinds of merchandise, ranging from ice to honey. Others are using their "home-made" trucks for small hauling jobs. Only the other day I stopped to look over a converted truck parked along the road, and the owner thereof, who seemed a reasonably truthful man, told me he had earned $75 during the past two weeks from various hauling jobs.

Some of these home-built trucks are very serviceable creations, while others reflect, in their clumsy design, the constructor's limited knowledge of the problems involved in converting a passenger car into a truck.

Here's How

By applying the instructions and rules given in the following pages anyone of average mechanical ability should be able to successfully convert a passenger car into a very serviceable truck capable of carrying 1 to 1¼ tons; at very moderate cost, and using the original chassis. Inasmuch as many dimensions, body details,



Medium weight cars like Studebaker (shown above) and Willys, Cadillac and the like can be used to haul 1 to 1½ tons if the precautions for converting to truck usage are followed. Middle view shows a suggested design for general use.

OWN Truck *and Earn an Income With It*

by JAMES G. THOMPSON

etc., will be largely governed by the make of automobile used and the constructor's individual preference, the following article must of necessity be general in nature.

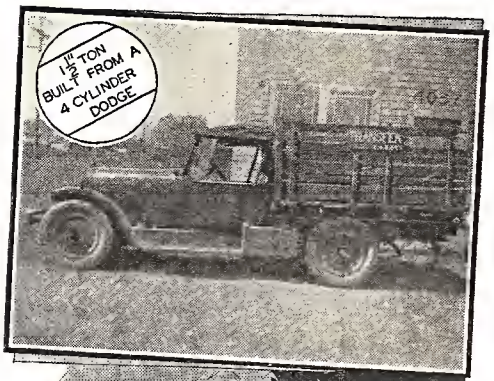
The principal problems involved in conversion are (1) providing overload springs to carry the added weight, (2) designing and building a body or bed on the chassis and (3) fitting larger tires to support the increased weight.

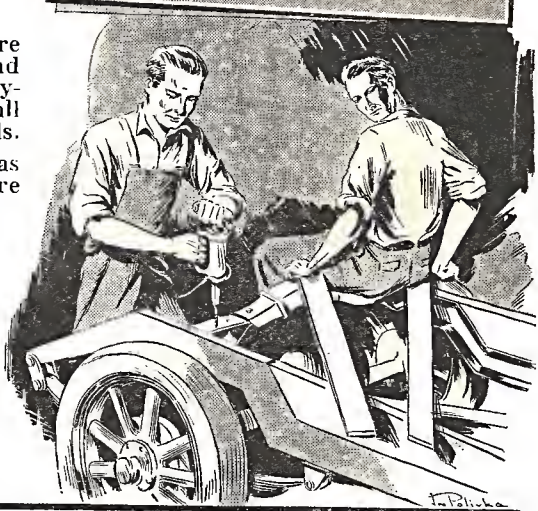
Don't Overload Fords or Chevs

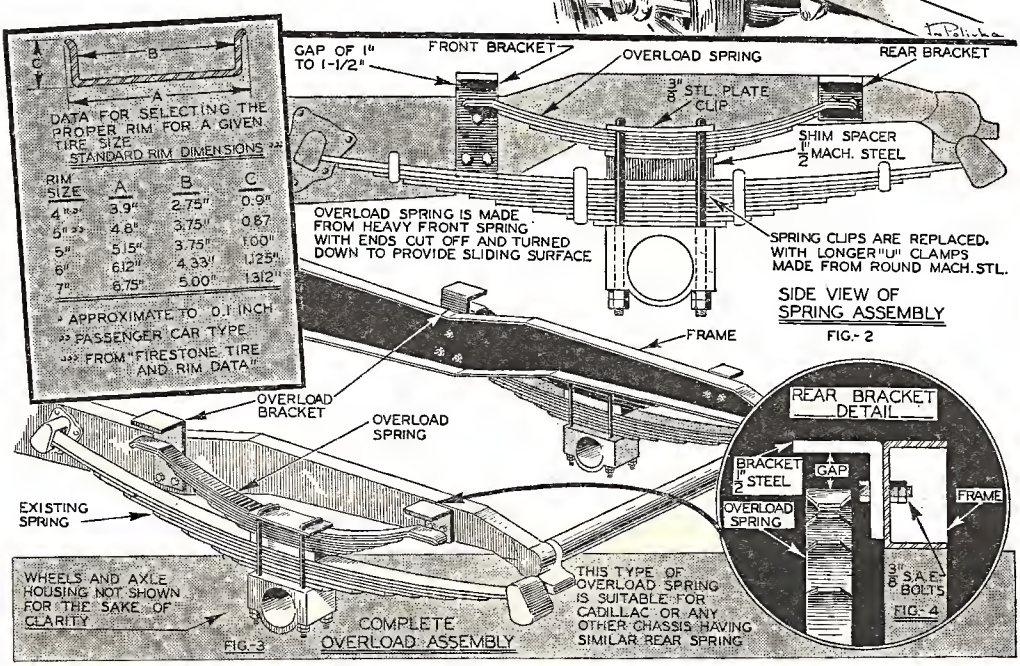
Light cars, such as Ford or Chevrolet, are suitable for conversion into delivery and "pick-up" jobs of about 1,000 pounds carrying capacity. The light chassis of these small cars does not permit carrying larger loads.

Medium and heavy-weight cars, such as Studebaker, Willys-Knight, Cadillac, etc., are sturdy enough to carry substantial payloads. Obviously, the larger the car, the greater the load that can be carried after conversion into a truck. However, payloads greater than 1½ tons should not be consistently carried on any truck built upon a passenger car chassis, if normal economy and freedom from mechanical troubles are expected.

When selecting an automobile for truck conversion measure the distance from the






C
B
A
DATA FOR SELECTING THE PROPER RIM FOR A GIVEN TIRE SIZE
STANDARD RIM DIMENSIONS
RIM SIZE | A | B | C
4" | 3.9" | 2.75" | 0.9"
5" | 4.8" | 3.75" | 0.87
5" | 5.15" | 3.75" | 1.00"
6" | 6.12" | 4.33" | 1.25"
7" | 6.75" | 5.00" | 1.312"
APPROXIMATE TO 0.1 INCH
PASSENGER CAR TYPE
FROM "FIRESTONE TIRE AND RIM DATA"
GAP OF 1" TO 1-1/2"
FRONT BRACKET
OVERLOAD SPRING
REAR BRACKET
3/8" STL. PLATE CLIP
SHIM SPACER 1/2" MACH. STEEL
OVERLOAD SPRING IS MADE FROM HEAVY FRONT SPRING WITH ENDS CUT OFF AND TURNED DOWN TO PROVIDE SLIDING SURFACE
SPRING CLIPS ARE REPLACED WITH LONGER "U" CLAMPS MADE FROM ROUND MACH. STL.
SIDE VIEW OF SPRING ASSEMBLY
FIG.- 2
FRAME
OVERLOAD BRACKET
OVERLOAD SPRING
EXISTING SPRING
WHEELS AND AXLE HOUSING NOT SHOWN FOR THE SAKE OF CLARITY
FIG.-3
COMPLETE OVERLOAD ASSEMBLY
REAR BRACKET DETAIL
BRACKET 1" x 1/2" STEEL
GAP
FRAME
OVERLOAD SPRING
3/8" S.A.E. BOLTS
FIG.- 4
THIS TYPE OF OVERLOAD SPRING IS SUITABLE FOR CADILLAC OR ANY OTHER CHASSIS HAVING SIMILAR REAR SPRING

The first thing to tackle after selecting a good chassis is the matter of springs. These should be of the overload type instead of added leaves to carry the weight, as the truck would ride too hard if thicker leaves were used, giving tire trouble.

back of the front seat to the centerline of the rear axle. The greater this distance the longer the truck bed that can be built upon the chassis. If possible secure a car with full-floating rear axles.

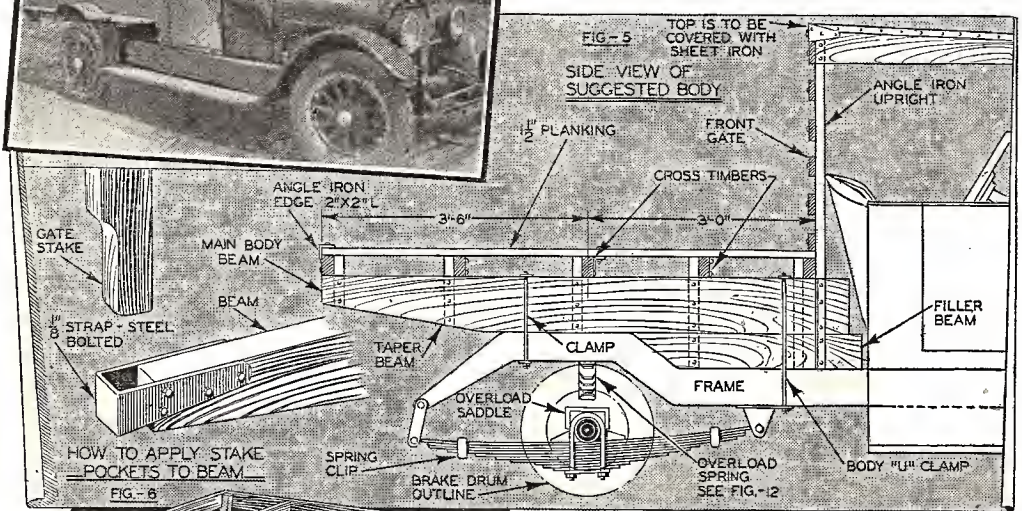
Sedans and phaetons are best for conversion owing to the greater ease of removing the rear portion of the body by simply severing it in line with the forward edge of the rear doors.

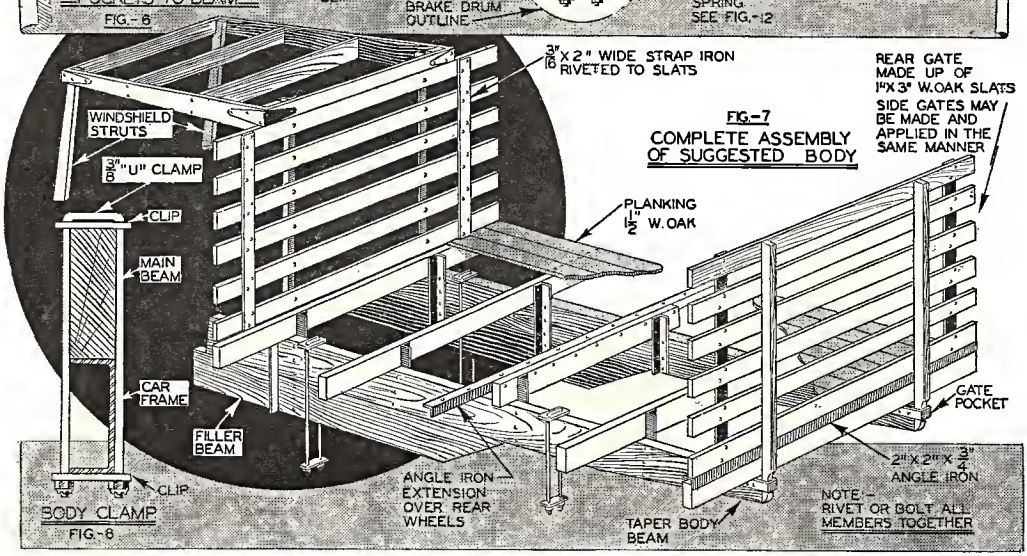
After removing the aft section of the body inspect and overhaul the engine and driving mechanism while all parts are accessible. The entire machine will be called upon to give its utmost in truck service—give it a thorough checking over. It is much easier repaired now than in the middle of the night, fifty miles from "no-where."

Increased Tappet Clearance

When overhauling the engine increase the valve tappet clearance about 50% to compensate for increased engine heat when pulling heavy loads. Unless this caution is heeded burnt valves are sure to result.

Thoroughly recondition the brake system. The brakes will be called upon to hold twice as much as before; don't take chances with them. The hand brake should not be neglected; it also should be adjusted, and relined if necessary.





Frame jogs are accommodated by filler beams. Top drawing shows creditable result of conversion of Cadillac into an ice wagon. Middle view shows plan for body stringers and lower view describes stake details with U bolt fitting diagrams.

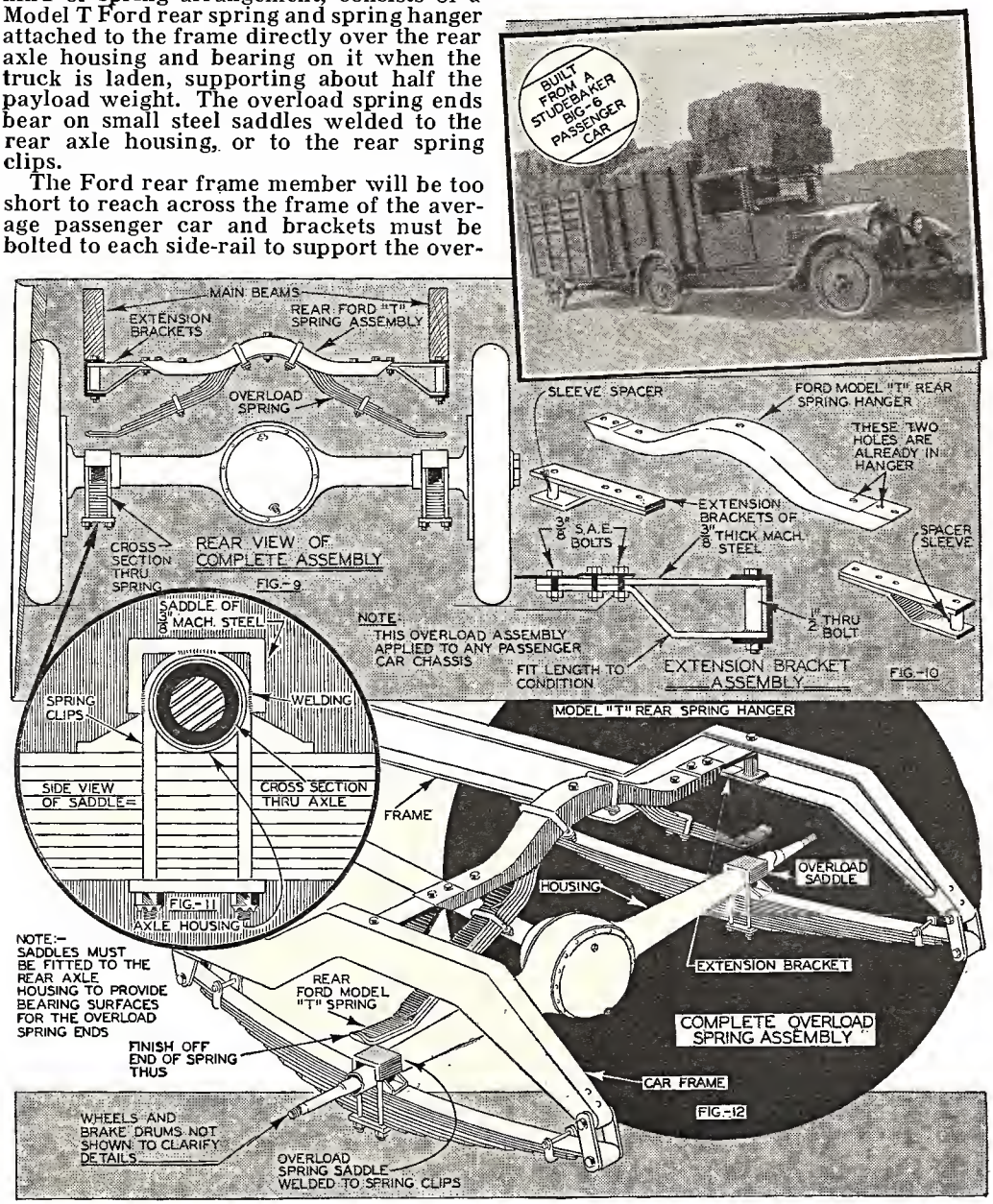
Overland Spring Design Assures Strength With Smooth-Riding Qualities

The first step in conversion is providing suitable overload springs to support the increased weight. Adding leaves to the rear springs would permit carrying the load but the truck would "ride" too hard, with ill effects upon tires and chassis. Overload springs, which are not in use when unladen, are best for payloads over 1,000 pounds.

The best "all around" overload spring, and one that can be used with nearly any kind of spring arrangement, consists of a Model T Ford rear spring and spring hanger attached to the frame directly over the rear axle housing and bearing on it when the truck is laden, supporting about half the payload weight. The overload spring ends bear on small steel saddles welded to the rear axle housing, or to the rear spring clips.

The Ford rear frame member will be too short to reach across the frame of the average passenger car and brackets must be bolted to each side-rail to support the overload spring hanger. These brackets each consist of two lengths of ½x2 in. machine steel bent to shape and drilled for attachment bolts. As can be seen from the accompanying illustrations, one length of steel is bolted to the top side-rail flange and the second strip to the lower flange. Both pieces are bent to meet at the end of the overload spring hanger and slip inside.

(Continued on page 138)

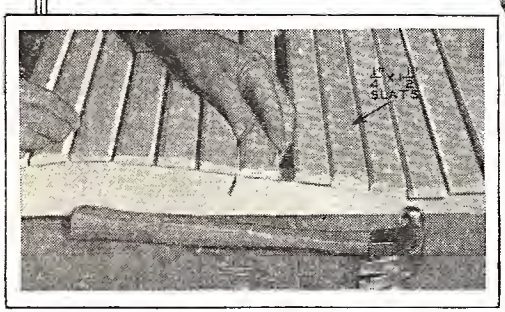

BUILT FROM A STUDEBAKER BIG-6 PASSENGER CAR
MAIN BEAMS
EXTENSION BRACKETS
REAR FORD "T" SPRING ASSEMBLY
OVERLOAD SPRING
CROSS SECTION THRU SPRING
REAR VIEW OF COMPLETE ASSEMBLY
FIG.-9
SLEEVE SPACER
FORD MODEL "T" REAR SPRING HANGER
THESE TWO HOLES ARE ALREADY IN HANGER
EXTENSION BRACKETS OF 3/8" THICK MACH. STEEL
3/8" S.A.E. BOLTS
SPACER SLEEVE
1/2" THRU BOLT
NOTE:- THIS OVERLOAD ASSEMBLY APPLIED TO ANY PASSENGER CAR CHASSIS
FIT LENGTH TO CONDITION
EXTENSION BRACKET ASSEMBLY
FIG.-10
SADDLE OF 3/8" MACH. STEEL
SPRING CLIPS
WELDING
SIDE VIEW OF SADDLE
CROSS SECTION THRU AXLE
AXLE HOUSING
FIG.-11
NOTE:- SADDLES MUST BE FITTED TO THE REAR AXLE HOUSING TO PROVIDE BEARING SURFACES FOR THE OVERLOAD SPRING ENDS
FINISH OFF END OF SPRING THUS
MODEL "T" REAR SPRING HANGER
FRAME
HOUSING
OVERLOAD SADDLE
EXTENSION BRACKET
REAR FORD MODEL "T" SPRING
COMPLETE OVERLOAD SPRING ASSEMBLY
CAR FRAME
FIG.-12
WHEELS AND BRAKE DRUMS NOT SHOWN TO CLARIFY DETAILS
OVERLOAD SPRING SADDLE WELDED TO SPRING CLIPS

Suggested bracket assemblies are described in these drawings. Overload saddles must be placed on the axle to prevent wear. Method of providing for overload spring is shown above. See load of hay hauled by Studebaker conversion.

PORCH SWING *Has Inviting Comforts*

No chains get in your way and interfere with your comfort when you are sitting in this porch swing. The ends can be released and let down to convert the seat into cot for taking an afternoon nap.

Chief details of construction are seen in the three photos above. Ends of the seat crosspieces extend out two inches to hinge to the bottom of the arm horizontal members. Note how end of arm is notched to fit around the end pieces on the backs. The straight sections of the pipes attach to the seat bottom with pipe clamps, while the upper end of the pipe is clamped with a strip of band iron which hooks into the chain or spring.



How slats for seat are nailed to the form-fitting end pieces.

BECAUSE it is suspended from curved iron pipes, this comfortable porch swing has arms that are unobstructed by chains, rods or other supports. Furthermore the ends can be let down so that the swing becomes a comfortable cot for an afternoon nap.

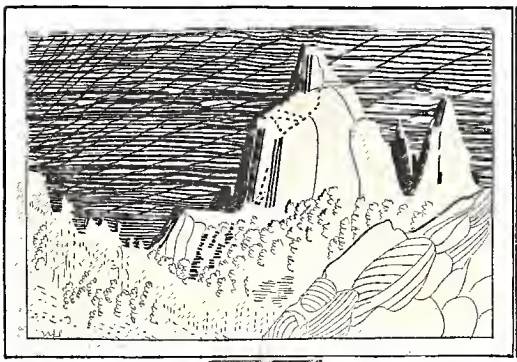
Dimensions are as follows: Seat, 19 in. wide and 60 in. long; back, 22 in. high and 60 in. long; arms, 25 in. long, 12 in. high. Front and rear pieces of the seat must project about 2 inches to permit fastening of the ends, which likewise have 2 in. pieces below the lower horizontal member.

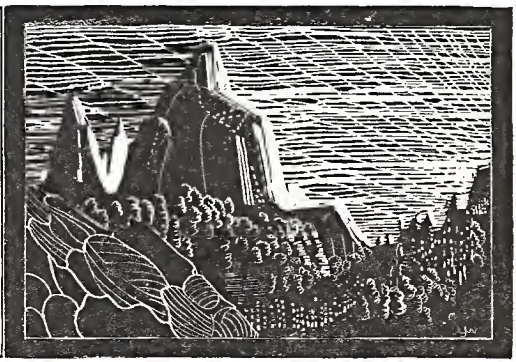
Two 6½ ft. lengths of ¾ in. black iron pipe are bent so that when in position the pipe extends across the bottom of the swing near each end, up around the back, and out a few inches beyond the vertical center line through the arms. Each piece is attached to the seat with pipe clamps in front and rear.

A little experimentation may be necessary to find the point at which the supporting chains which attach to the ceiling must be fastened. A clamp made of band iron and drilled for a bolt encircles the pipe at the upper end to take the chain or spring.

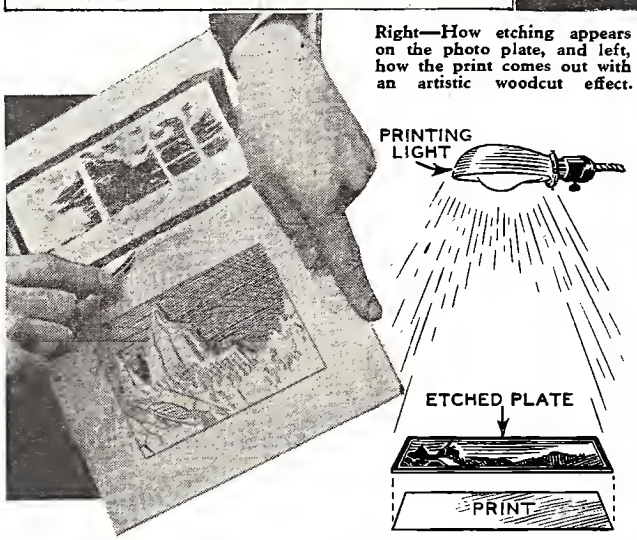
You will find that the pipe itself is an excellent shock absorber, and that it tends to give slightly when the seat is occupied.

Making Photographic Etchings, Woodcuts





Right—How etching appears on the photo plate, and left, how the print comes out with an artistic woodcut effect.



With a pocket knife having a sharp point, tool out the lines drawn on the coated glass plate. Prints from this plate are made as in printing any other negative film, and the lines then appear black as in an etching.

Here's an etching as it prints out. Flat background tone is obtained with an opaque mat.

IF YOU are artistically inclined and would like to have more than the original drawing which you make, a simple way to obtain an unlimited number of replicas, either in the style of woodcuts or etchings, is to make your original drawing upon a sheet of coated glass, scratch out the lines with a pen-knife, then make prints from the negative thus obtained, just as when printing any other negative.

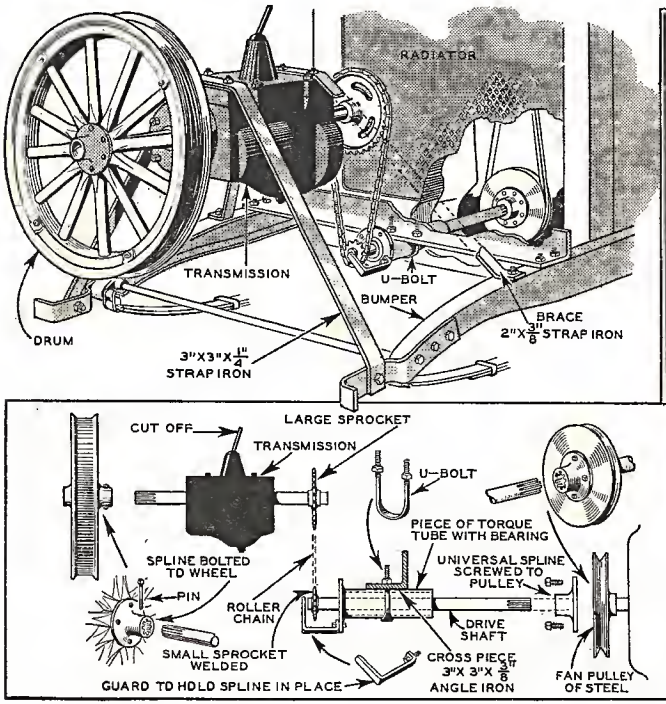
Remarkable effects of etching, such as are made on copper which has been etched with acid, are possible. No other chemicals are required than the stock developers and fixing bath employed in making photographic prints. If you desire, the printing from your etching can be done by the photographic dealer who prints your other films.

Discarded, out of date plates intended for the camera make excellent material for your etchings. Of course, such plates have not been developed, and the emulsion upon them is the ground upon which your drawing is to be made. With the sharp point of a knife the lines are scratched through to the glass. A phonograph needle fixed in the end of a pencil is another convenient etching tool.

If the woodcut style is desired, the etched lines should appear white instead of black in the print. To accomplish this, the first print, either on paper, or film, becomes a negative from which the finished prints are made. Very remarkable effects are possible without the bother of employing printer's ink and presses. Since the emulsion is translucent, a mat of opaque paper cut to fit the picture will permit, by longer exposure during printing, the characteristic production of a flat tone as a background for the picture.

An ordinary printing machine is employed for making the woodcuts and etchings and the length of exposure is not critical.

Auto Motor Powers This Utility Hoist



Hoist is employed to snub rope as illustrated above. Details of assembly are seen at left. No dimensions are given as they vary with materials available and make of truck to be equipped.

UTILIZING parts picked up in auto wrecking lots a very useful and efficient hoist may be eheaply eonstructed on the front of a truek or auto with a few tools suitable for doing some heavy boring.

The steel fan pulley, shown in the drawings above, has to be turned out at a machine shop. It was found by experience that the stoek east iron pulley would not stand up under the strain imposed on it. To the front of this steel pulley is attached one of the spline plates by means of ⅜ in. maehine serews. The male spline is on the end of the section of drive shaft which extends through the front of the radiator by about six inehes. Total length will be about one foot.

Holes are bored in the frame just in front of the radiator and a piece of angle iron is bolted aeross on which the pieee of torque tube, whieh aets as a bearing for the short shaft, is attaehed. Note that this bearing is held in place by a U-bolt flattened in the middle. Then onto the end of the drive shaft is welded a small sprocket wheel taken from the timing system of an old Studebaker.

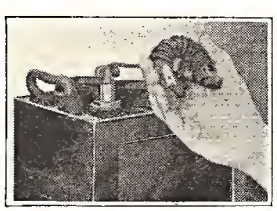
Next bore a hole in the frame on either side about six inches in front of the cross piece already in place. This is to hold the angle iron whieh is to support the rear end of the transmission. The transmission is supported in front by a piece of strap iron bolted onto the top and bent so as to fasten onto the bumper bars.

Onto the shaft extending out the back of the transmission is welded the large sprocket. Onto the male spline extending out in front is fitted the pulley wheel in the manner illustrated. To remove the wheel, the pin through the spline is taken out. All that is needed to eomplete the assembly now is a ehain between the two sproeket wheels.

The transmission gives one his choice of three different speeds or power with a constant engine speed. It also provides a means of disengaging the drum wheel when necessary. When moving, if desired, the spline fitting onto the fan pulley may be pulled out by moving the guard, thus eompletely disconneeting the unit. No dimensions are given as length and sizes will vary according to the materials available and the make of the truek to be equipped.

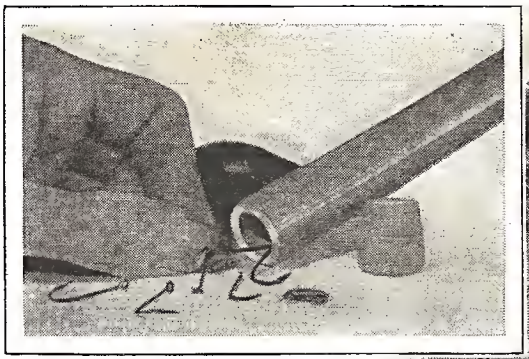
Restoring Life to Old Magnets

OLD magnets may be rejuvenated by winding a piece of No. 12 wire on them, connecting the ends to a storage battery. Five-second applieations of juiee repeated several times in hour will restore magnetism. Ten or 12 turns of wire will suffice.



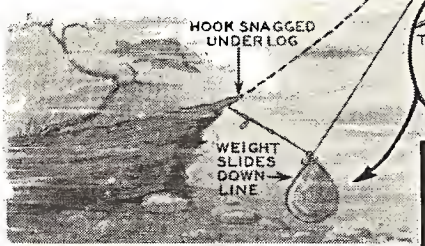
Restore life to magnet by winding on ten or twelve turns of No. 12 insulated wire, hooking ends to a 6-volt battery. Give three 5-second charges an hour.

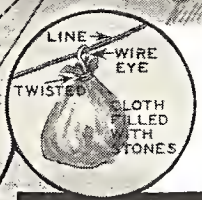
Page of Practical KINKS for Fishermen

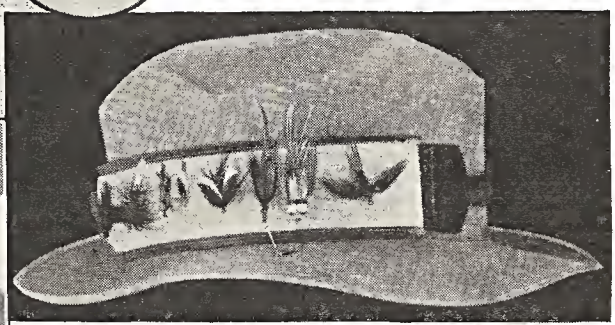


The end joint of a bamboo fishing pole makes an excellent case for carrying extra fish hooks and sinkers. A cork, fitted to the end, does duty as a "lid" for the case.

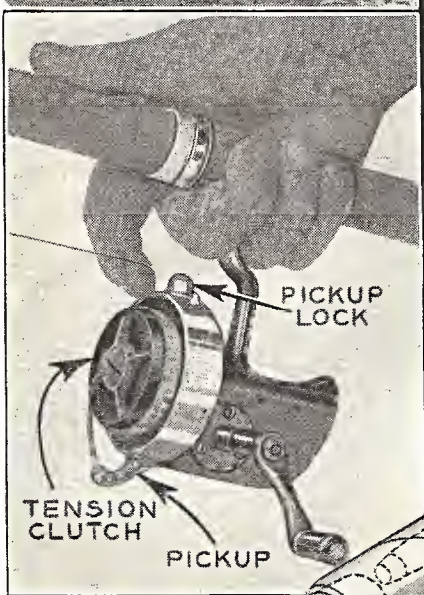
When your hook gets snagged on a sunken log, gather up some heavy stones and wrap them in a handkerchief and tie the neck. Then twist a piece of wire around neck and form an eye. Slide weight down line and jiggle to unsnag the hook.



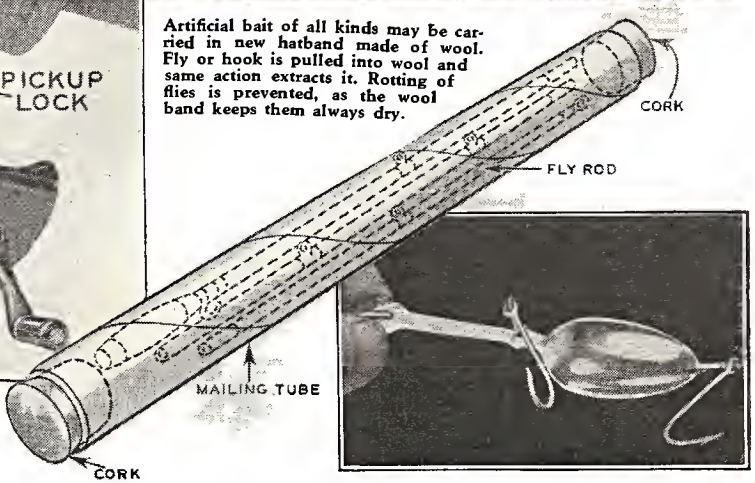




Artificial bait of all kinds may be carried in new hatband made of wool. Fly or hook is pulled into wool and same action extracts it. Rotting of flies is prevented, as the wool band keeps them always dry.



Overrun and backlash is prevented by recently patented reel. Pickup is locked in place for cast, but line slips off stationary reel coil when cast is made. Free hand then starts reeling in line, which automatically releases pickup on first revolution. Line is then wound in neatly on the drum.



A large mailing tube, varnished and plugged at ends with corks, makes a substantial carrying case for sectional flyrods. Right—Ordinary bright metal teaspoon can be fashioned into practical fish lure of trolling spoon type by attaching hooks as shown. Cotter pin holds spoon on swivel line, allowing hook change.

A fairly realistic working model is this Sibley version of the old Ben Hamilton, Ohio River patriarch. Here is Sibley, Jr., sailing the model Hi built in the Sibley back yard fountain pool. She's driven by a toy vertical steam engine.

A Model SIDE-WHEELER for Shallow Water

by HI SIBLEY

THIRTY-FIVE years ago the original "Ben Hamilton" plied the St. Joe river between South Bend and Mishawaka, Ind. Its picturesque old skipper declared that it had such a light draught it could navigate through a heavy dew. That remark is faintly reminiscent of Mark Twain. At any rate Ben Hamilton the First was obliged to paddle in precious little water and its namesake illustrated here can do proportionately as well.

The principal advantage of a side-wheeler is that it permits a very shallow draught, although there is obviously much more work on it than on a propeller boat. However, this type is somewhat of a novelty and a very able performer. Steam power, too, has distinct advantages in that it generates its own energy and does not have to be wound up or have its batteries charged. It will run as long as there is fuel and water, and with this little vessel that is a long time.

Start With the Hull

As usual, begin with the hull, and make it of white pine. If there is a better material for this purpose for the conventional style of boat we have yet to hear of it.

The hull block is built up in sections, cut as shown. The central piece is cut out in the middle by boring holes in the corners and cutting the rest with keyhole or coping saw. This piece is one inch thick, which with the other pieces gives enough depth to bring the amidships-gunwale safely above the water line.

By hollowing out a part of the bottom piece you can bring your engine lower down in the boat, and thus lower the center of gravity. Even if this is not done the broad beam makes the boat amply stable in the water.

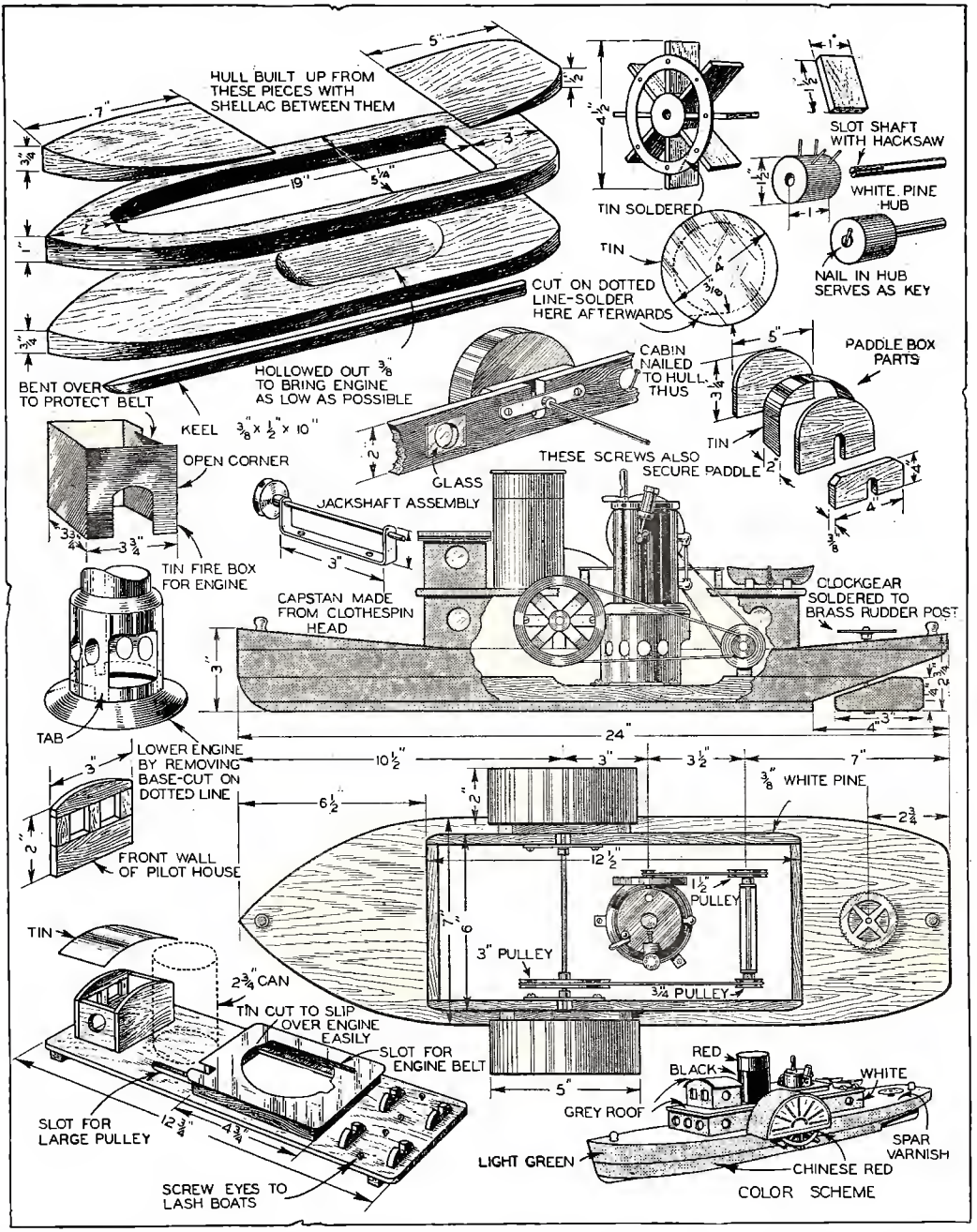
Apply shellac liberally over the surfaces and screw the pieces securely together. Drill guide holes for the screws first, and use those of small diameter. Do not attach the keel until the hull is shaped after being put together.

Glass for the Portholes

After shaping and sandpapering well, drill a hole for the rudder post and install the bow and stern capstans, which are made of the heads of clothespins. Next build the cabin walls of ⅜" white pine or redwood (cedar, you call it in the East, I believe). Before putting the walls together bore ¾" holes for the portholes, located something as shown on the color chart. There are three in the forward end, and two besides a doorway in the after-end. All the holes are covered on the inside with glass (do not use celluloid) held in place with shellac. However, do not glaze the ports or door in the after-end of the cabin as these serve as air intake to the boiler.

The slots for the paddle-wheel shaft should be large enough so there will be

Toy Vertical Engine Belted to Paddle Wheels; Horizontal Just as Good



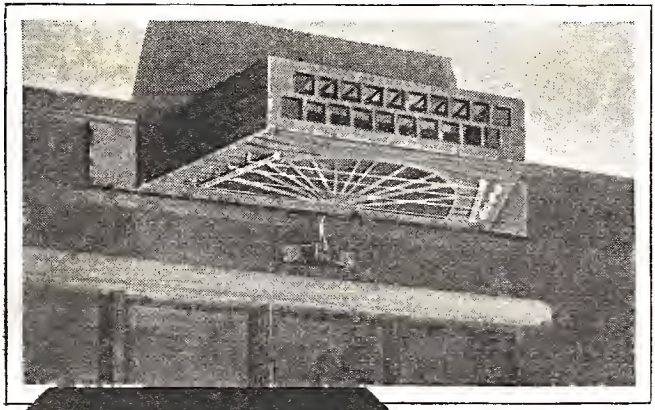
Only one lift on the hull is sawn completely out. The bottom can be hollowed a little to sink the engine. The paddle wheels are built up of spool stubs for hubs and doweled wooden paddles. Note color scheme, which can be varied.

no possibility of the shaft rubbing. The latter should touch only the bearing-plates, the perforated strips from a toy construction set.

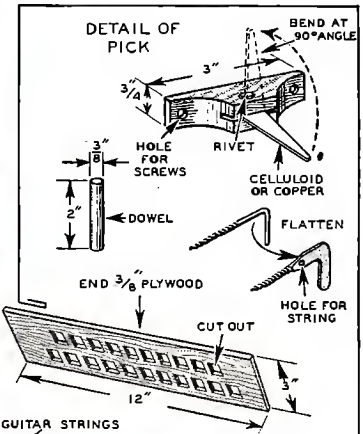
Next locate the engine as per plan. The type used here was selected because of its ample boiler capacity and compact size. It cost $2.00. If a horizontal engine could be found of equal capacity it would be preferable. However, the type installed in the original was very satisfactory after removing the base and cutting off about ¼" from the lower end of the fire box, leaving material for three tabs with which to screw it to the bottom of the hull. Location of

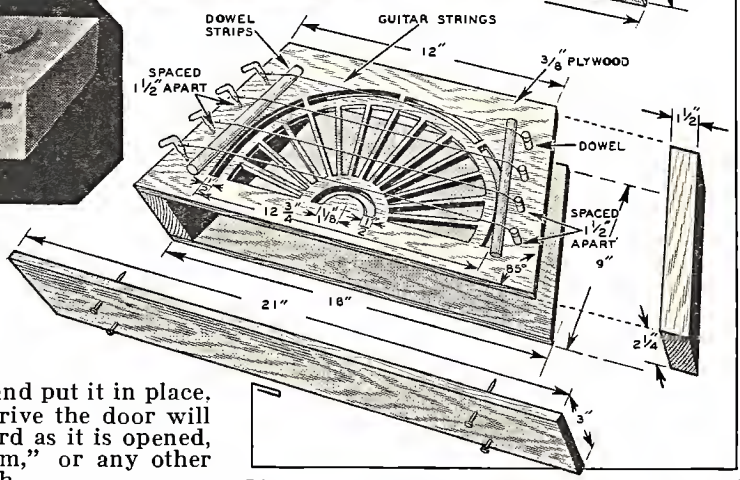
(Continued on last page)

HARP Plays TUNE When Door Opens



At top is seen the harp in position ready to strike up a tune when the door is opened. Door top should clear strings ½ to ¾ inches, and pick should be mounted so that 3/16 in. of tip brushes across the strings. The lower photo shows scroll work.





Dimensions for all parts are given here. Top and front end are cut out with a scroll saw. Birch dowel may be used as a bridge, but a No. 8 copper wire will give greater volume.

MAKE this door harp and put it in place, then when guests arrive the door will strike a harmonious chord as it is opened, sounding "How dry I am," or any other four notes you may wish.

Besides some scrap lumber which you doubtless have in the shop, you will need two guitar strings, one wrapped, the other plain steel, four screws of the shape shown and about 8 inches of ⅜ inch birch dowel.

Lay out the top and bottom and with the scroll saw cut out the pattern shown for the bottom side. Likewise for the front. All necessary dimensions are given in the accompanying drawing. Assemble pieces with glue and nails.

Boring Holes for Dowel Pins

Bore holes 1½ inch deep ⅜ inch in diameter spaced 1½ inches apart along one side for the dowel pins and at corresponding points along the other side bore smaller holes for the screws. Flatten the ends of these wide enough that small holes may be drilled to take the ends of the wires. Turn these screws down until about ½ inch above the surface.

Cut two dowel strips to lay under the strings, then, cutting the two strings in half, proceed to string the harp as illustrated in the drawings. The strings will have to be tuned several times until they have stretched and all "give" in the box has been sprung.

For a pick you will need a small block of wood cut to the shape shown, with a slot in the top, and a narrow, triangular piece of rather stiff celluloid, copper or some other flexible material riveted in place.

The harp is placed above the door in the manner shown in an accompanying photo. The top of the door should clear the strings by ½ or ¾ inches, and the pick screwed to the door in such a manner that about 3/16 inch of the tip brushes across the strings when the door is either opened or closed.

Harp Mounted Out of Way

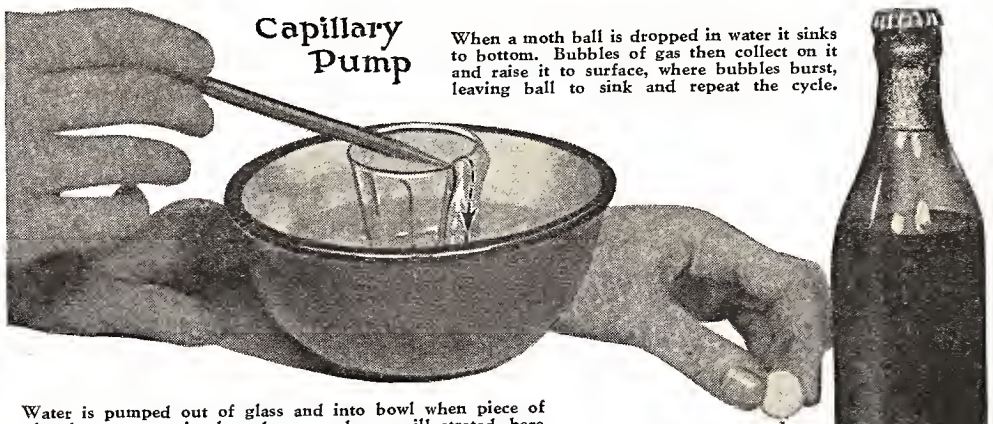
The harp is out of the way and after being used for some time, will not need tuning very often. A suitable finish is walnut stain although the harp may be painted any suitable color. Plywood ¼ inch thick will give just as good results and the resonance may be greater. You can tune the four strings with a piano or organ. Use a pair of pliers when tuning the harp.

You may have to do considerable tuning to get the notes you want. Work with a piano, however, and you can make a quick job of it.

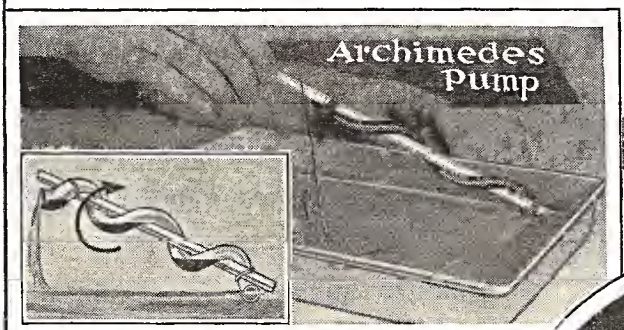
Learn Physics from Fascinating STUNTS

Capillary Pump

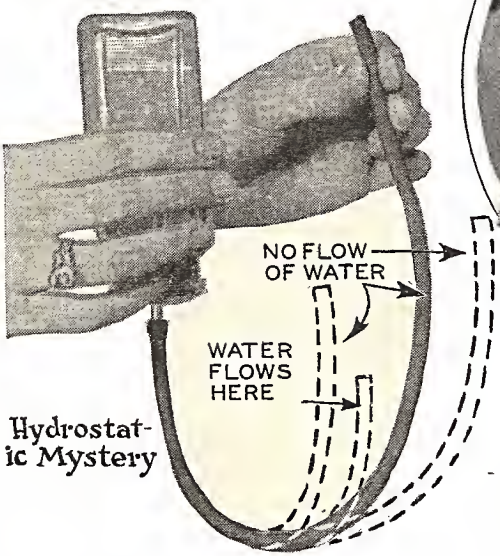
When a moth ball is dropped in water it sinks to bottom. Bubbles of gas then collect on it and raise it to surface, where bubbles burst, leaving ball to sink and repeat the cycle.



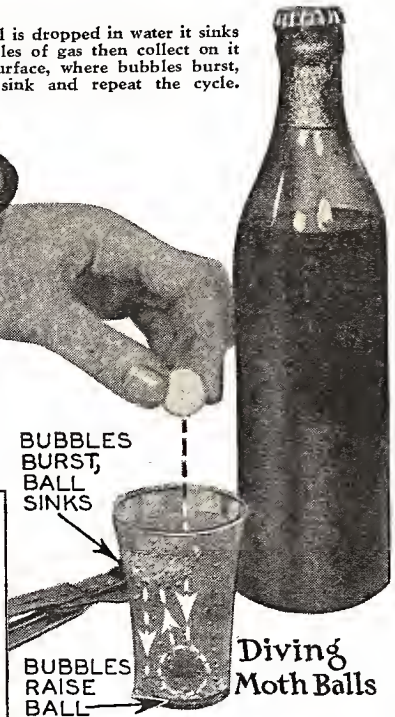
Water is pumped out of glass and into bowl when piece of absorbent cotton is draped over edge as illustrated here. The force of capillary attraction draws water up cotton, over top and down into bowl till certain level has been reached.



When rubber hose is twisted around pencil spiral motion causes the water to pour from top. Water always flows to the bottom of the spiral and is lifted in this manner.



Hydrostatic Mystery



Diving Moth Balls

Above—Glass half full of water is covered with glass and inverted. Partial vacuum is then created, so that the water and glass remain in position shown even when hand is withdrawn. Left—Perform hydrostatic mystery experiment by connecting hose to bottle in manner illustrated. If hose is held as shown no water will flow. Even if held below surface of water still no water flows, due to resistance of hose. However, there is a critical angle where the liquid spouts freely from end of tube. Explain its tricky behavior if you can.

HAWAIIAN *is* EASY

by **PAUL W. GARTNER**

YOU are 300 feet off the beach in a heaving warm surf. You watch your chance of catching a big comber just as she breaks, and as the sled breasts the sea you flip your little water sled end for end, heading her nose toward shore.

The sea lifts and starts to break. But it never does as far as you are concerned! You are sliding down the forward face of the great warm wave at 30 miles an hour! The sled is going so fast that it has become very stable, and you can get up and stand upon it. Say, is this fun? Wow!!

One ride and you'll say there is nothing in the world, not even flying, that has the fun that this thrilling water sport has. And that the water sled is the greatest invention in the world. But wait till I tell you—

Used on Beach at Waikiki

The original Hawaiian water sleds or surf boards are solid planks of light native wood. Unless you are living right in Hawaii, you'd have to have the raw materials shipped to you. Gloom. Not so good. Visions of water sled vanish.

But up pops Thomas E. Blake, a friend of mine, who has improved the original water sled until the product shown here is even superior, faster and lighter than the original Waikiki article.

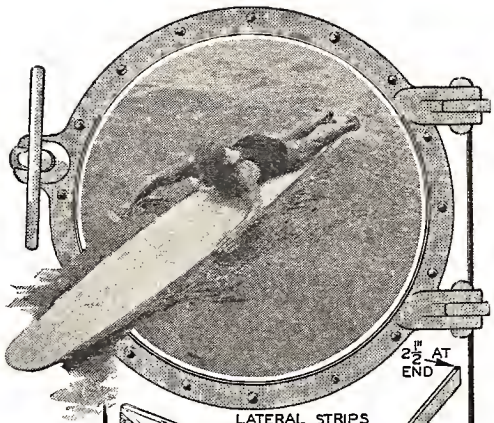
Blake was a life guard at Waikiki and these are his own plans. The resulting sled is so good that he had it patented, being issued U. S. Patent No. 1,872,230 on Aug. 16, 1930. We have a letter, forwarded to the editor of MODERN MECHANIX AND INVENTIONS, allowing every reader to build from these plans. Mr. Blake felt it would bet-

2 4 6 8 10 12 14 16 18 20 22
LAY OUT BULKHEAD PATTERS ON HEAVY WRAPPING PAPER WITH 1" SQUARES THEN TRANSFER TO WOOD MEMBERS
BOW VIEW
STERN VIEW
BODY LINES AT MAXIMUM DEPTH
3/4" CROWN
NOTCHES FOR LATERAL STRIPS
2 1/2"
TYPICAL BULKHEAD DETAIL
Jul Sliwka

Top view: Sled coasting. Center: Laying out sections. Below: Building and using sled. Note swimming position. The sled rides downhill on the forward face of the wave when coasting in the surf, and attains great speed. As shown left below, the sled is fine for developing a swimmer's shoulder and arm muscles, and is useful for rescue work.

WATER SLED to BUILD

Through arrangements with the patent holder Modern Mechanix and Inventions is presenting this fine piece of aquatic sporting equipment which has many novel uses. Build one and get a new thrill sliding down combers at the sea shore!



ter serve the aquatic world to make the plans public than to try to "farm" them in some other way. Of course, it is understood you are not to build a sled for sale.

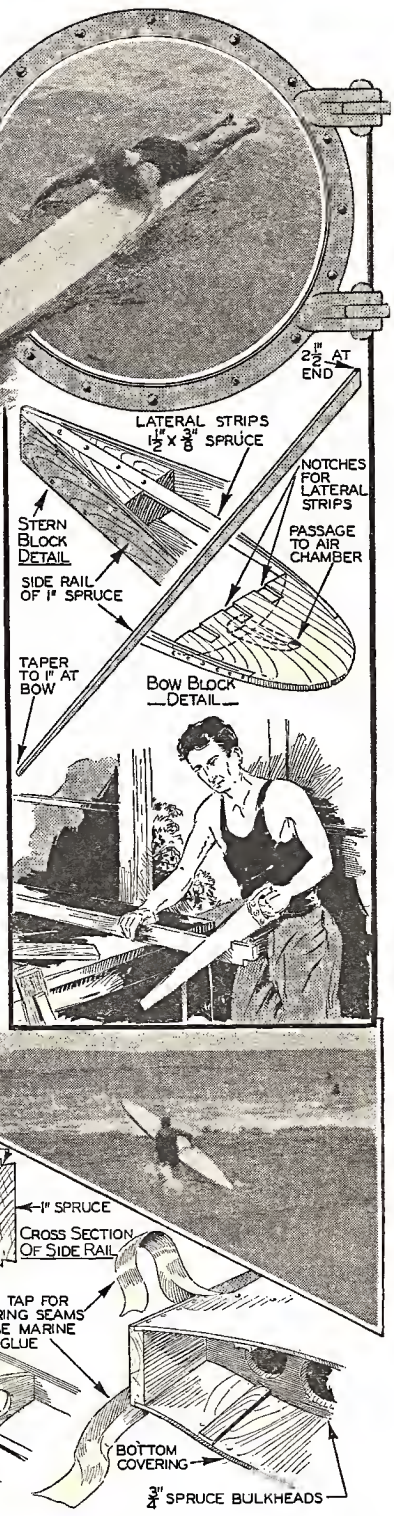
New Sled Great Improvement

The new sled is bigger and lighter than the Hawaiian article.

Increased efficiency has resulted among lifesaving crews on southern California beaches with the adoption of this hollow surf board.

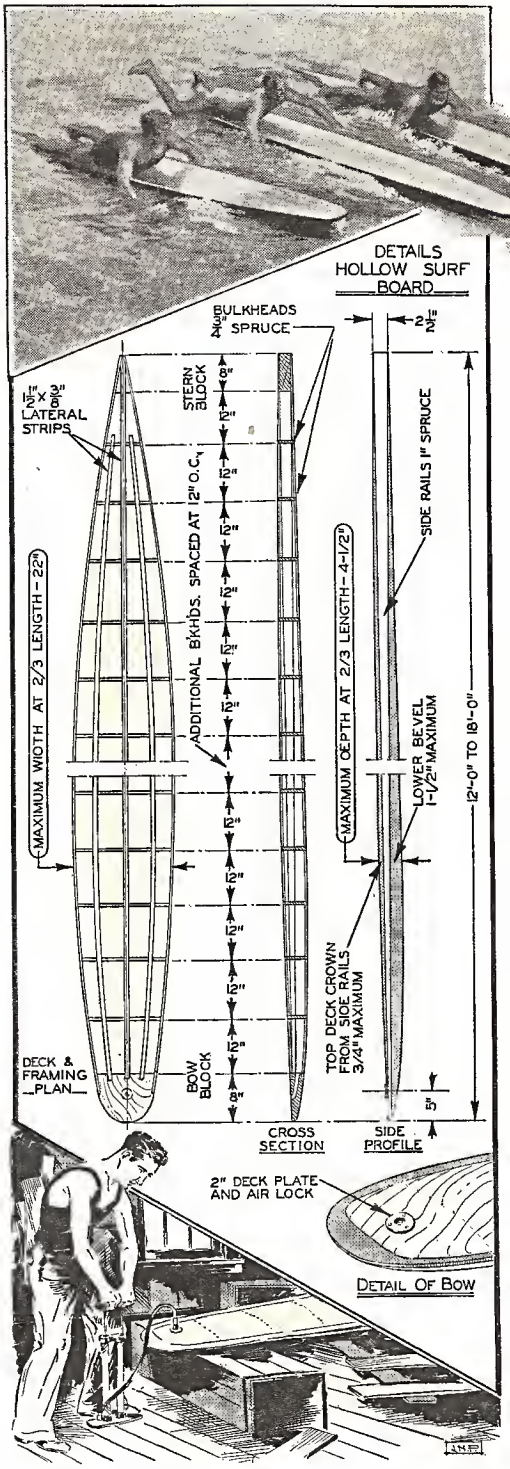
A life guard operating a water sled can cover 100 yards in a little more than 30 seconds, which is approximately half the time required by an expert swimmer to negotiate that distance. And where a swimming rescuer may face serious difficulty in approaching and handling a person in distress, the man upon the buoyant board simply pulls his subject aboard and paddles to safety.

The dangers of the tide rip—a treacherous current which sweeps seaward along a local channel formed by the backwash of the breakers—are minimized by the use of the water sled. Not infrequently a single tide rip will find several unfortunates caught at the same time. Upon the hollow board a lone guard may keep afloat from six to ten persons. In addition, the water sled is very effective in bearing a paddler seaward


2½" AT END
LATERAL STRIPS 1" x ⅜" SPRUCE
NOTCHES FOR LATERAL STRIPS
STERN BLOCK DETAIL
PASSAGE TO AIR CHAMBER
SIDE RAIL OF 1" SPRUCE
TAPER TO 1" AT BOW
BOW BLOCK DETAIL
3/16" OR 1/8" MASONITE TEMPERED PRESDWOOD OR THREE PLY VENEER
GROOVE FOR DECKING
1" x ⅜" LATERAL SPRUCE STRIPS
1" SPRUCE
CROSS SECTION OF SIDE RAIL
BKHDS
CLOTH TAP FOR COVERING SEAMS USE MARINE GLUE
CLOTH TAPE
BOTTOM COVERING
SPRUCE SIDE RAIL CONSTRUCTION DETAILS HOLLOW SURF BOARD
¾" SPRUCE BULKHEADS

Top: How sled is paddled. Right center: Launching sled in surf. Other views clearly show construction of sled. The bow block may be a piece of white pine and the side strips of spruce. The stern block is of spruce. The battens may be of any light wood which will hold fastenings well. In spite of its length, the board is light and easily handled.

Air Lock Used to Equalize Pressures



While not specified by designer, an additional air lock has been suggested, behind which is an inner tube which will float sled in extreme emergency. Otherwise an ordinary air lock is used so water is kept out and pressures can be equalized.

through the breakers, as well as shoreward with them. It is faster than a dory handled by two men when launched through the surf.

The hollow surf board is operated with the rider lying upon his stomach on the rear half. Holding his head up he rotates his arms at the shoulders, simultaneously dipping with both hands as if they were the oars of a boat. When underway, the board fairly skims the surface, its bow high, the top surface of the stern at water level. It is very sensitive to applied power and may be stopped within a few feet by the operator dragging both feet and hands. In the case of a rescue the water sled can carry two persons almost as easily as one. The second person, possibly a near victim of drowning, rides in almost the middle of the board, held steady by the operator's shoulders and arms.

Although the Hawaiian water sled was developed primarily as an aid in lifesaving, it has become quite popular as a craft for racing and taking short cruises, so to speak. A person possessing strong, supple shoulders can readily travel distances which may be measured in miles. Paddling the board is emphatically a sporting way to develop the shoulders and back muscles. And of course, it may be used for wave riding after the manner of the ordinary surf board.

Hawaiian water sleds may range in length from 12 to 18 feet, by 22 inches in width, the maximum width being two-thirds of the length forward. They weigh from 40 to 60 pounds, depending upon the size and the weight of the deck. The sides taper from a pointed 2½-inch stern to a rounded 1-inch bow. Both top and bottom decks are beveled, the deepest portion of the board, 4½ inches, being two thirds of the length forward. The greatest beveled thickness in the top deck is ¾ of an inch, while in the bottom it is 1½ inches.

Frame of the Sled

The frame of the water sled is entirely of spruce. There are from 10 to 13 transverse braces ¾ of an inch thick, with holes bored or scrolled to eliminate weight and to make the interior of the board a single air chamber. There are three lateral braces along the top and three along the bottom, each 1½ inches wide and ¾ of an inch thick. The rails, 1-inch wide, are steamed to bend and grooved to receive the deck. They taper from a bluntly-pointed stern block, 8 inches long by 2½ inches deep, to a rounded bow block, 8 inches long by 1 inch deep.

The material of the decks may be 3-ply veneer, or 3/16-inch or, perhaps, ⅛-inch Masonite Tempered Presdwood. It is joined to the grooved rail with Number 10 flat-headed brass screws every 1 or 1½ inches. It is advisable to insert them every inch along the bow and stern. The seam is made watertight by the use of Jeffery's quality C

(Continued on page 143)

SPARKS from the RADIO EDITOR

Edited by L. B. ROBBINS

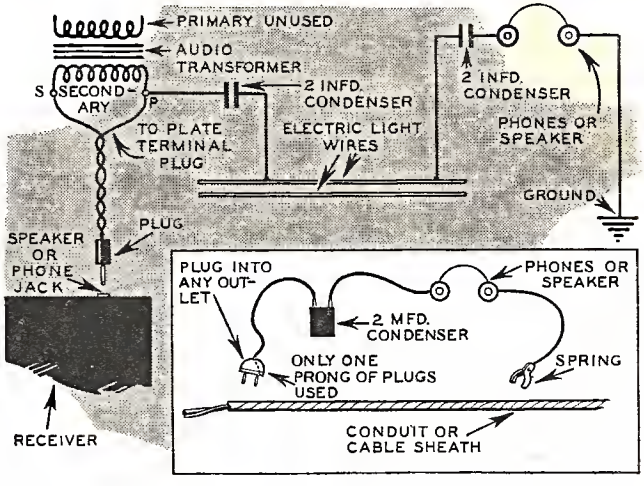
Hooking Up Speaker Anywhere in House

HERE is a novel idea by which you can send the radio program anywhere in the house without having to string wires to the phones or speaker.

Instead of using a speaker or phone right at the set, the plug is connected to the secondary of an old audio transformer as shown. The connection from the plates of the receiver audio tube connects to P on the transformer and from there to one side of a 2 mfd. fixed condenser. The B plus receiver connection hooks to the other side of the secondary winding. Connect the other side of the condenser to one prong of a bayonet plug (not shown in drawing).

At the receiving end connect a wire to one prong of a second bayonet plug and connect the other end to one side of a 2 mfd. fixed condenser. The other side connects to phones or speaker.

Insert the two bayonet plugs into any convenient receptacle, making sure the wired prongs make contact with the same wire on the line. Then ground the clip by clamping it to the BX sheath or water pipe.



Wires from 2 mfd. condensers attach to light wires through bayonet prongs.

Start the receiver and plug into the speaker or phone jack as shown. Thus by the aid of the two coupling condensers and the electric light wire and ground you can hear the program at any point in the house where the wires and ground can be reached. It is a good idea for the sick room or room far away from the receiver.

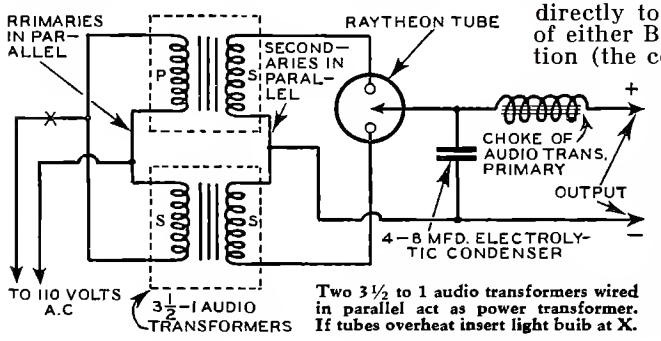
An Inexpensive, Low Current Power Pack for the Beginner's Transmitter

A TRANSMITTING amateur, just entering the game and finding himself short of power supplies, can use the power pack shown in the accompanying diagram with assured success. The writer used this same hookup to operate a pair of 245 tubes as oscillators, and on 40 and 80 meters, obtained reports of steady signals, pure DC and ranging from R5 to R8 in volume.

The power transformers consist simply of two matched audio transformers. 3½ to 1 ratio seems to give the best general results. Mount them together on a suitable baseboard, then connect the primaries together in parallel as shown.

The outside ends of the turns connect directly to the plates of a Raytheon tube of either B or BH type. The third connection (the cold anode) connects to one side of the filter choke and one side of a suitable fixed condenser (cost half dollar) as shown. The choke can be the primary of a heavily constructed audio transformer.

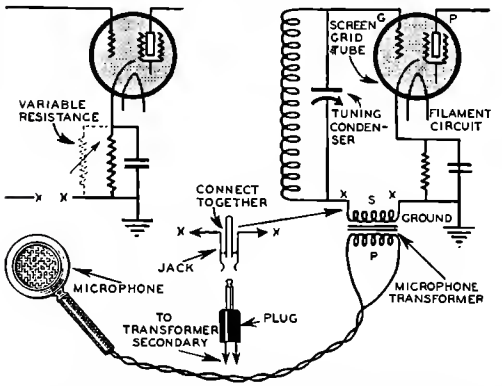
With 110 volts input, using 3½ to 1 transformers, you will get about 350 volts output. The final output will be in the vicinity of 300 volts, pure direct current at about fifty milliamperes.



Two 3½ to 1 audio transformers wired in parallel act as power transformer. If tubes overheat insert light buib at X.

How to Hook Microphone Up to Your Broadcast Receiver

MANY radio users wish to use a microphone with their sets to broadcast their own voice. This calls for a slight alteration in the detector hookup as shown in the sketch at the left.



To hook microphone to receiver, cut the receiver circuit at points XX and connect in outer prongs of jack. Plug leads to secondary of transformer. Clear up voice by variable resistance (about 2000 ohms) inserted as shown.

You will need a microphone transformer and a closed circuit jack. Break the receiver circuit between the cathode resistor and the rotor of the tuning condenser. Insert here the microphone transformer, connecting the secondary winding as shown. To make the connection temporary, use a closed circuit jack here, connecting its open prongs to the transformer secondary as shown. Then the receiver will operate normally with the plug out or will take up the mike circuit when the plug is inserted.

To clear up the voice a variable resistance of at least 2000 ohms can be shunted across the cathode resistance, as illustrated in the drawing. Adjustment will smooth out the sounds and reduce all tinishness.

This stunt is suitable for use with the microphone on the opposite page.

Four Standard Output Circuits for Use With New Pentode Audio Tubes

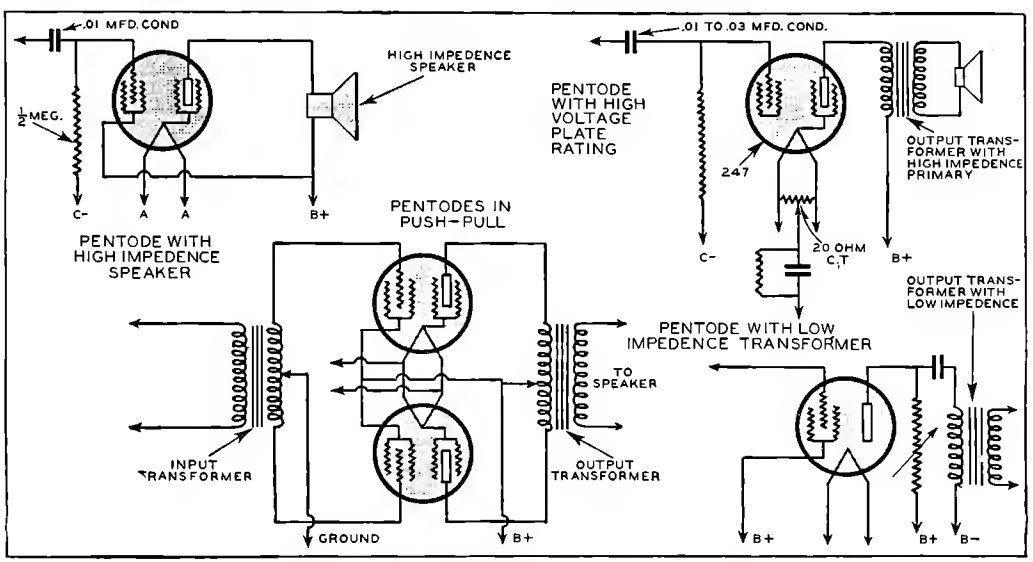
THE use of the pentode tube for audio output often puzzles the constructor of a receiver. But the hook-up is simple and any one of the four circuits shown below will solve the trouble for the usual case.

In the top left circuit is shown the pentode used in connection with a high impedence speaker. The plate connects direct to one speaker terminal and the B plus to the other and to the screen. The ½ megohm resistor takes cares of the grid suppression and can be varied to suit.

The lower left circuit shows how two such tubes are connected in push-pull. The usual input transformer is used but the primary of the output transformer must be of high impedence to match that of the speaker.

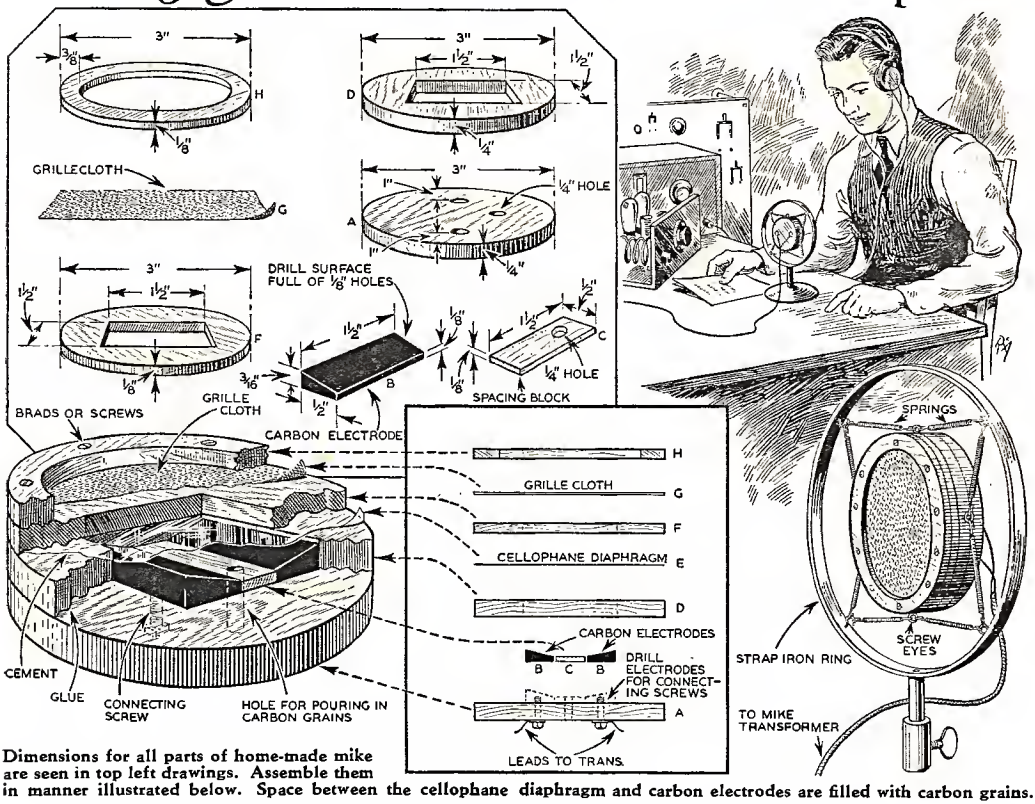
With pentodes of high voltage plate rating, such as the 247 using 250 volts, follow the top right diagram. Here an output transformer must be used to match the impedence of the speaker, with a high impedence primary.

The last drawing shows how to use a pentode with a low impedence primary of the output transformer. In this case the plate voltage is applied to the plate of the tube through a variable resistance. Thus the voice coil of the speaker receives the voice current through the coupling condenser. A bit of experimenting is necessary to find best resistances, etc., to use.



Pentode tubes may be employed for audio output by following any one of the circuits shown here, as your case demands.

Making Your Own Broadcast Microphone



Dimensions for all parts of home-made mike are seen in top left drawings. Assemble them in manner illustrated below. Space between the cellophane diaphragm and carbon electrodes are filled with carbon grains.

IT IS possible for the average experimenter to construct a real high quality microphone that will compare very favorably with the more conventional broadcast type. It requires no great skill and very few tools, but a large stock of patience and accuracy in making the parts. All parts, unless otherwise specified, are made of wood.

First, make the two carbon electrodes B-B. An old No. 6 dry cell carbon pole furnishes the material. Cut it roughly to shape with a hack-saw and finish off by rubbing it *very carefully* against a sheet of sandpaper. Then drill, *very slowly and very lightly*, a hole through it for its connecting screw.

Now to begin building the case. Disc A is first. Drill two holes an inch from the edge to receive the machine screws that hold the carbon electrodes in place. Put the electrodes in place and pull the screws up securely—but not too tight or the electrodes will break. In between the electrodes glue the spacing block C.

Now, glue disc D on top of Disc A. Stand a weight on it while it dries. Before going any further drill a ¼-inch hole through A and C for filling the mike with carbon grains later on.

With an eighth-inch drill very carefully drill the face of each electrode—until you have a pair of electrodes that look like a reduced version of a waffle-iron. Now cement a three-inch diaphragm of cellophane E on top of disc D. Stretch it just tight enough to pull out the wrinkles—and *no tighter.*

Over the cellophane secure disc F to the rest of the microphone with brads. Finally glue a circular piece of loud-speaker grille cloth over disc F and fasten ring H on top of it with four wood screws.

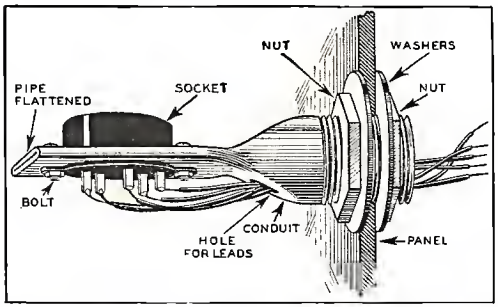
Now, secure a vial of carbon grains—the kind put up for experimental use, not the kind sold for re-conditioning broadcast microphones.

Turn the mike on its face and carefully fill the filler-hole full of carbon grains. Lift it off the table and gently tap it. The grains will gradually disappear into the innards of the microphone. Repeat this until no amount of tapping will make the microphone absorb more grains of carbon. Seal the filler-hole with wax—and the mike is finished!

This type of microphone is one of the most rugged known. Couple it to a 200 ohm primary microphone transformer, using the full primary. A twenty-two and a half volt "C" will make an ideal source of current for the microphone, and you will have no need of any sort of a current control.

A professional looking mounting for the mike is illustrated in the accompanying drawings.

Power Tube Panel Mounting Made From Piece of Conduit



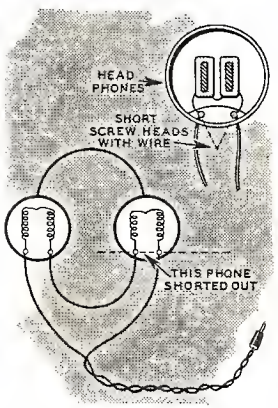
Mount the tube socket on flattened end of the conduit, and secure round end on front of panel with nuts and washers.

HERE'S an ideal socket mounting for tubes on public address amplifiers of amateur short wave transmitters. A short piece of 1½ in. malleable iron conduit is heated and placed in a vise. The jaws are then closed rapidly to flatten the end of the pipe. This flattened portion is then drilled for socket mounting and wire holes.

The nuts and washers ordinarily used on the conduit are employed to secure the pipe firmly to the front of the panel, as illustrated in the drawing at the left. Wires leading out of the rear arc connected into the circuit.

Locating Bad Phone in Headset

WHEN a pair of headphones goes dead the first thing to hunt for is a burned out magnet coil. A simple way is shown in the sketch.

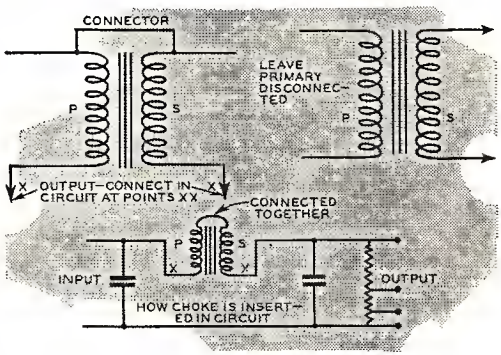


Short out bad phone with wire across terminals inside case.

Invariably it is only one phone that has gone bad. Being connected in series the circuit is, of course, broken. So the best method is by elimination. This is accomplished by shorting out first one phone and then the other.

Remove the earpiece and diaphragm from one phone. Hold a piece of metal across the two connector screws inside the case. Have the receiver running and place the other phone to the ear. If, when the remaining phone is shorted, sound comes into the other one you will know you have found the bad phone. Remove the cord from the bad phone and connect them together. Or, if you have a spare good phone, put it in place of the bad one.

Emergency Choke for B Eliminator



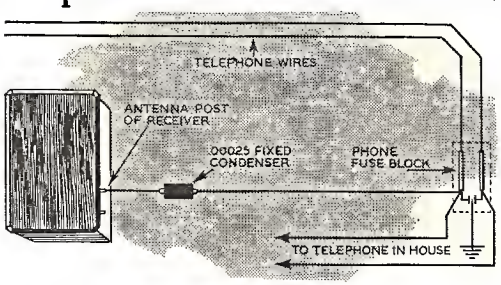
Primary and secondary of transformer are hooked together on one side while other side hooks into the filter circuit.

IF YOU have an old style B eliminator that has a burned out filter choke you can put it into commission again with the aid of a good ou', ut transformer made for speaker use.

The secondary can be used alone as a choke or the primary and secondary can be tied together as suggested. The latter method gives a better choking effect and is to be recommended.

Insert it as shown in the B plus line and use at least a 4 mfd. condenser each side. For an eliminator delivering *not over* 50 mils, this substitute will be found very good in an emergency.

Telephone Line Makes an Efficient Antenna When You're Short on Space

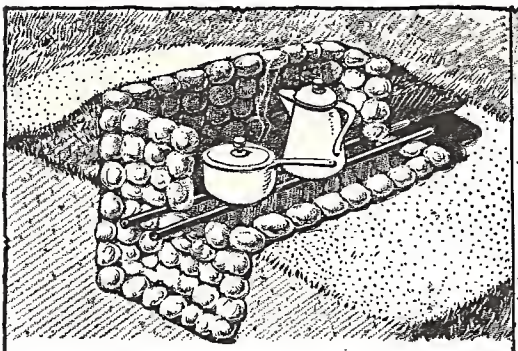


In using phone wires for antenna, lead from receiver, with condenser cut in, hooks to either side of line, either at fuse block or at the instrument. No annoyance from interference.

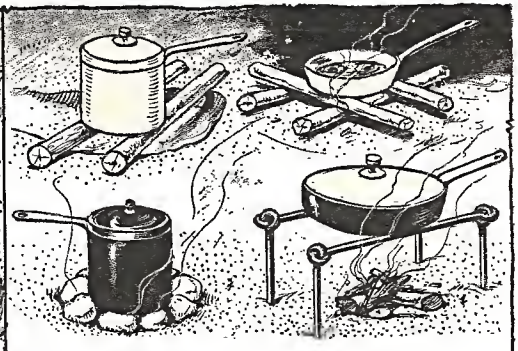
FOR the man who has little room for a receiving antenna for the radio, the telephone wires will do very nicely. It is only necessary to hook the receiver to them as shown. No interference will be felt either on the radio or the telephone.

Simply connect a short piece of wire to one side of a .00025 fixed condenser and connect the other end to the receiver antenna post. A spare grid condenser will work fine. Then connect the other side of the condenser to either one of the telephone wires. This can be done either at the instrument or at fuse assembly. Either wire will do as both connect to outside wire system.

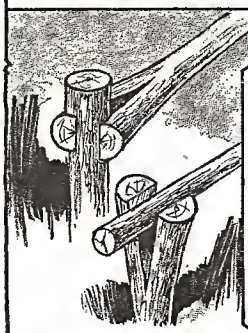
TRICKS of BUILDING a Camp FIRE



Permanent fireplace is built by excavating pit 3 ft. square and 2 ft. deep. Lioe with stones to ground level, and add two more tiers as windbreak. Fire irons are ½" pipe.

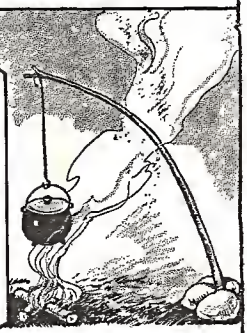


Three effective temporary fireplaces are illustrated here. Fire irons are made from ⅜ in. round iron 4 ft. long, with legs connected by rings at ends. Space 8 in. apart.

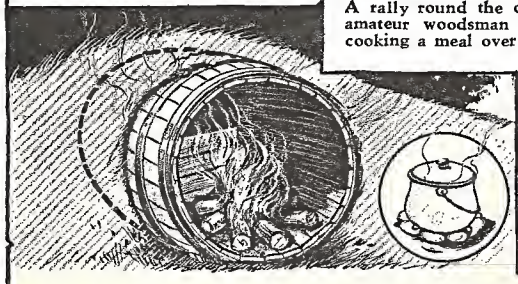


Here are two ways to join horizontal bars of a fireplace to the uprights.

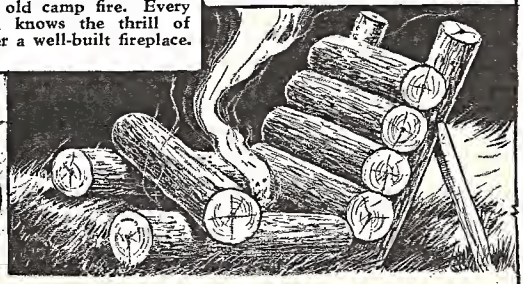
A rally round the old camp fire. Every amateur woodsman knows the thrill of cooking a meal over a well-built fireplace.



Simple stew fire is made by suspendiog pot over flames from inclined stick.

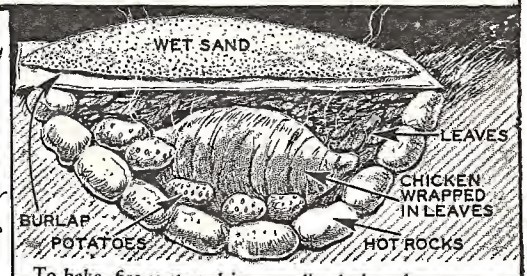


Partially bury keg and pack sod around it, except at ends. Build a fire, remove, then insert food and seal.



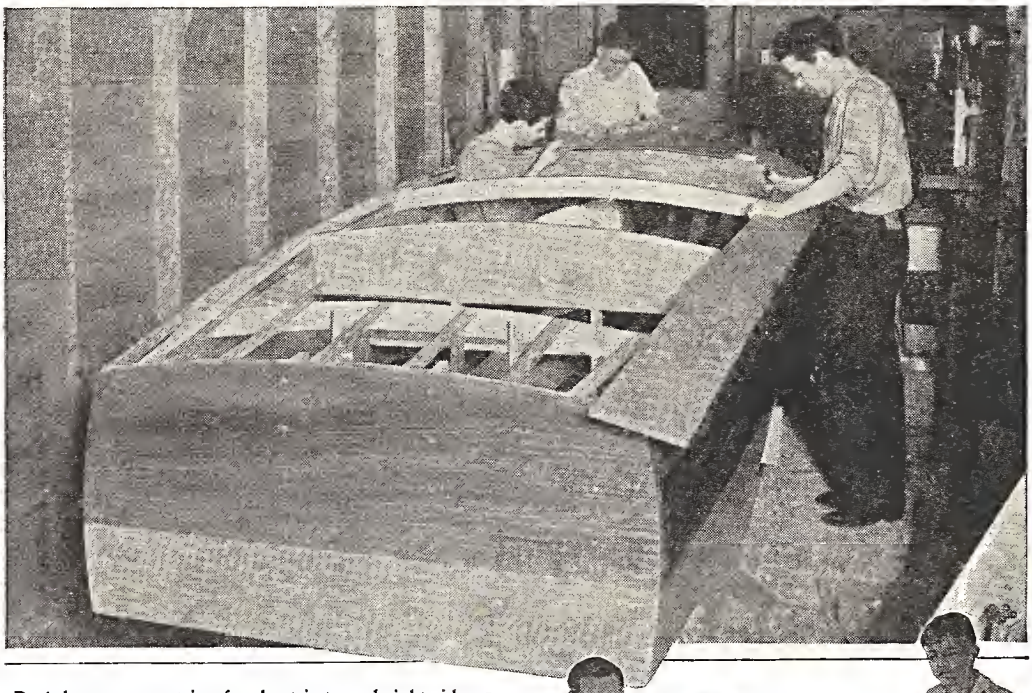
Ideal for windy days is fireplace made from green logs arranged as shown with log shield on windward side.

The trench fire. Ditch 8 in. wide and same depth is lined with stones and edged with green logs as shown.



To bake, fire is started in stone-lioed pit to heat stones. Rake out embers, place food on stones, then seal oven.

PLANS for "SCRAM" PART III

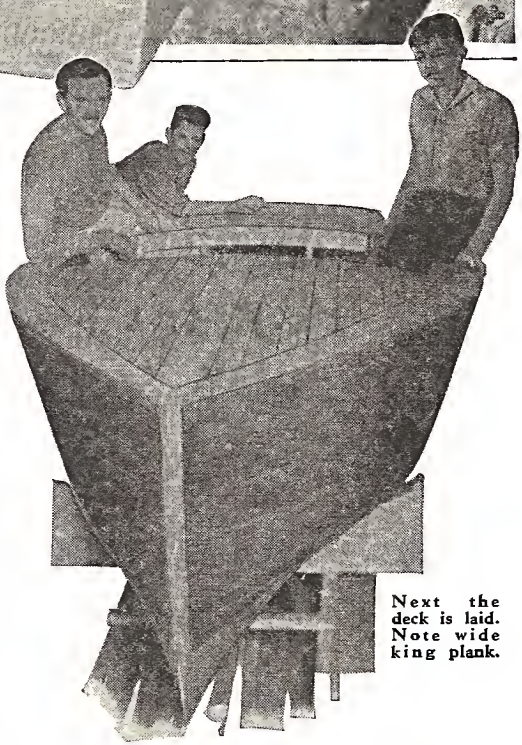


Deck beams are put in after boat is turned right side up and removed from strongback. This shows how the covering boards are marked out before fastening with screws.

IN THE publication of an article of this scope several months elapse between the first and last instalments. This gives readers a chance to send in questions and the final instalment is apt to be very different from the one the writer planned at first. This third and last instalment on *Scram* is no exception.

So first off we'll answer those questions, which for some reason or other seem to be bothering readers as a whole; then we'll proceed to the motor, and its conversion, as we originally planned.

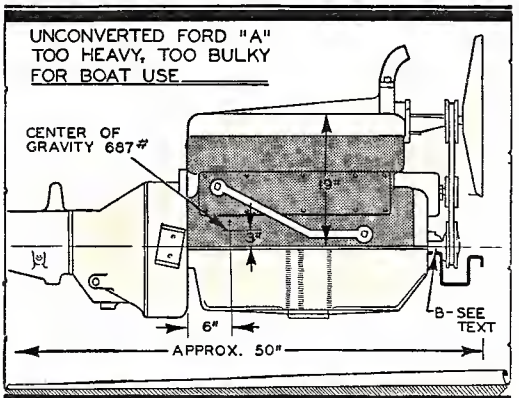
The matter of making the decks is pretty well shown in the photographs above. The boat is taken off the building molds, turned right side up, and the deck beams put in according to the plan of construction run on page 116 of the May issue of MODERN MECHANIX AND INVENTIONS. The deck beams and the stringers are fastened down with light brass screws, countersunk where needed, and then the covering board is marked out to shape as shown in the top photo, above, on this page. The deck edge boards are put on, or covering boards as they are called, and then as shown in the lower photo where myself, Maurie Lonn and Win Conrad are looking pretty for the nice photographer, the deck boards are screw fastened down, deeply countersunk and filled with mahogany colored plastic wood. This explains about as well as possible the matter of getting on the deck.



Next the deck is laid. Note wide king plank.

Aside from the usual foolish variety of questions which have popped up, the only other one seems to be the matter of cutting

Details Ford "A" Conversion Points

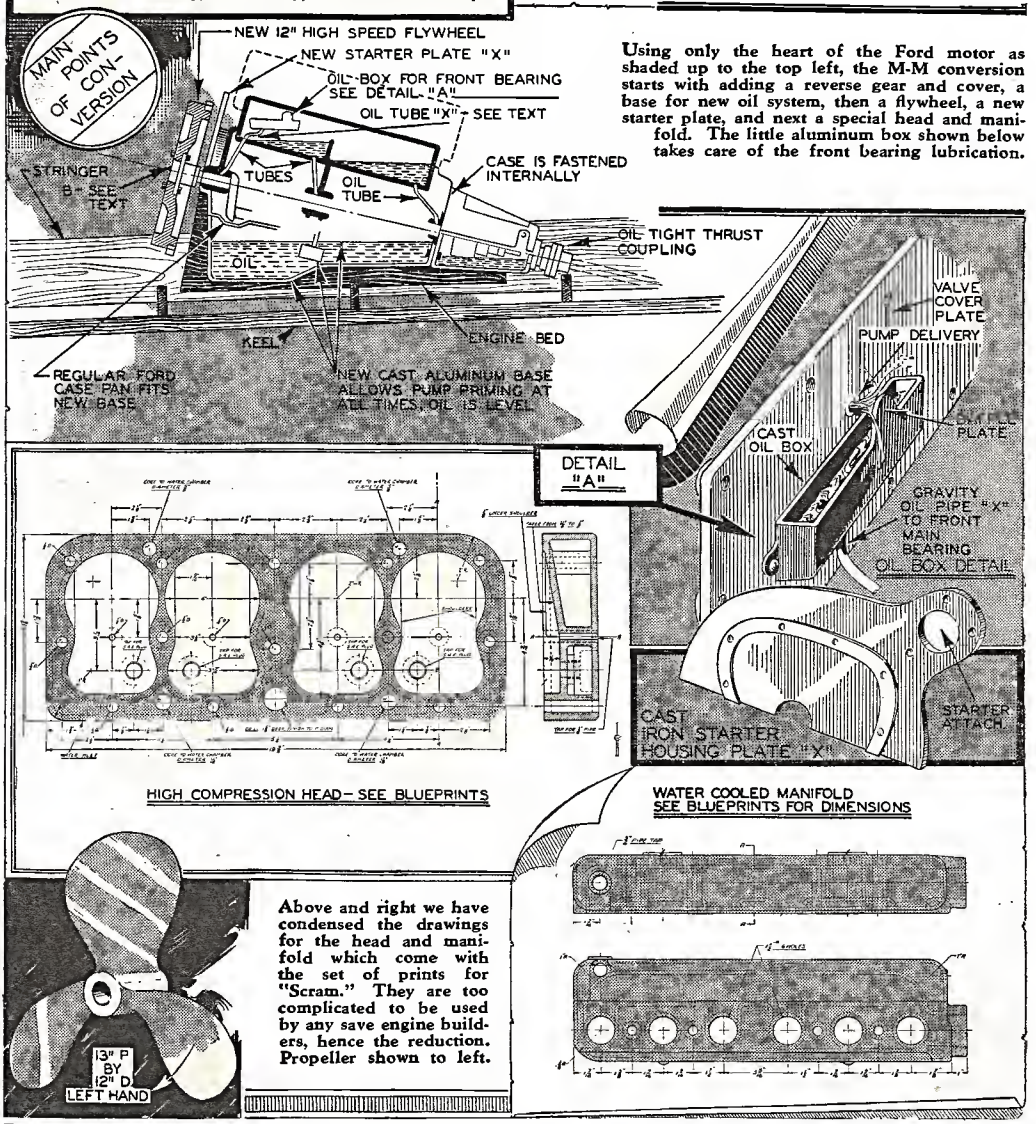


Showing why an unconverted Ford is no good for boat use. Too long, too bulky, and far too heavy.

the rabbet in the stem. When this article ran in How to Build 20 Boats (better get your copy if you are missing any points—the treatment of the yarn was slightly different in that book) I said the better way was to line the stem up in the strongback and cut it out there. I still think this is better for a man who knows what a rabbet is and how to cut it, for it fairs in with the boat perfectly. But if you want to cut it out on the bench, there's no harm in that and it is done after the manner shown in the cut on page 127.

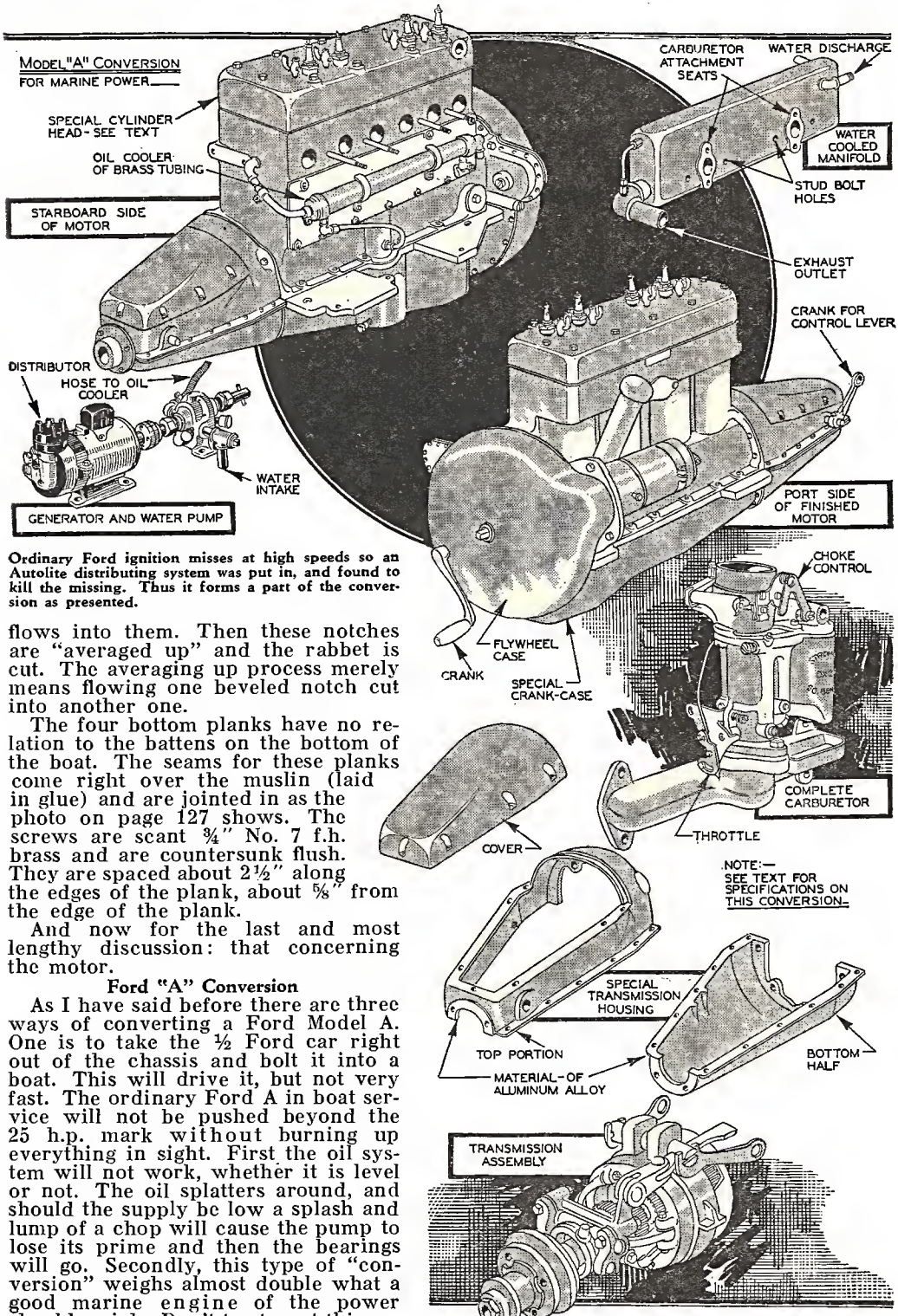
First the stem is blanked out and fastened together, the bolts are ⅜" carriage bolts with the heads countersunk and filed to fit the narrow face of the stem.

Then notches are cut at intervals with the bevels according to the way the plank



Using only the heart of the Ford motor as shaded up to the top left, the M-M conversion starts with adding a reverse gear and cover, a base for new oil system, then a flywheel, a new starter plate, and next a special head and manifold. The little aluminum box shown below takes care of the front bearing lubrication.

Above and right we have condensed the drawings for the head and manifold which come with the set of prints for "Scram." They are too complicated to be used by any save engine builders, hence the reduction. Propeller shown to left.



Ordinary Ford ignition misses at high speeds so an Autolite distributing system was put in, and found to kill the missing. Thus it forms a part of the conversion as presented.

flows into them. Then these notches are "averaged up" and the rabbet is cut. The averaging up process merely means flowing one beveled notch cut into another one.

The four bottom planks have no relation to the battens on the bottom of the boat. The seams for these planks come right over the muslin (laid in glue) and are jointed in as the photo on page 127 shows. The screws are scant ¾" No. 7 f.h. brass and are countersunk flush. They are spaced about 2½" along the edges of the plank, about ⅝" from the edge of the plank.

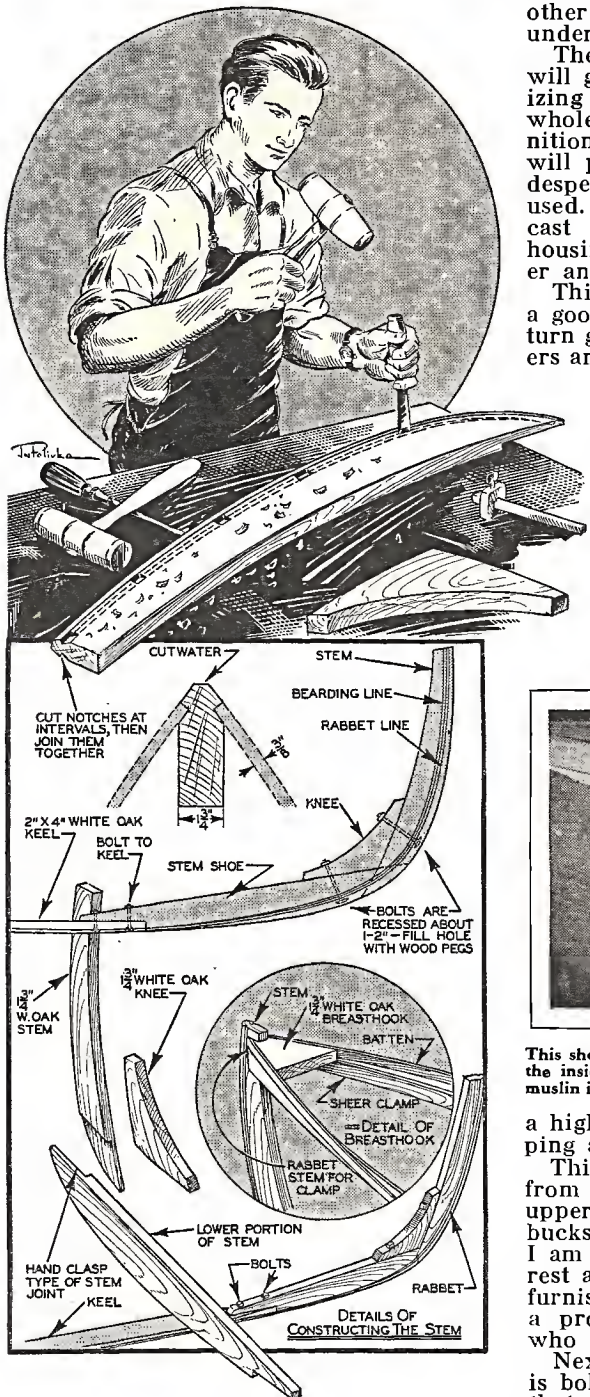
And now for the last and most lengthy discussion: that concerning the motor.

Ford "A" Conversion

As I have said before there are three ways of converting a Ford Model A. One is to take the ½ Ford car right out of the chassis and bolt it into a boat. This will drive it, but not very fast. The ordinary Ford A in boat service will not be pushed beyond the 25 h.p. mark without burning up everything in sight. First the oil system will not work, whether it is level or not. The oil splatters around, and should the supply be low a splash and lump of a chop will cause the pump to lose its prime and then the bearings will go. Secondly, this type of "conversion" weighs almost double what a good marine engine of the power should weigh. Don't try to put this engine in *Scram*. It won't work. And I

The gear is a Paragon, and the case encloses it snugly.

How to Carve the Stem Rabbet



This shows the way the rabbet for the stem can be cut. Notches are put in at intervals and then when these notches are averaged up the rabbet comes out all properly beveled. The bolts fastening the stem are 3/8 in. carriage bolts, which are filed side flat at the heads and countersunk on the outside very deeply with a chisel, and are then plugged with wood. Note breasthook details.

won't take the trouble to tell you if you cannot see that the hot manifold, among other things, would set fire to the works under that little hatch.

The second way is a passable one, and will give good service; it consists of utilizing the Ford block (the essence of the whole motor, anyway) and leaving the ignition system and head as it is. This plant will produce about 38 h.p. when the indespensable portions of our conversion are used. The portions are: deep capacity cast aluminum base, reverse gear and housing, thrust bearing, flywheel, oil cooler and manifold.

This job is some excuse for calling itself a good marine engine, because it will return good service. It can be used in cruisers and will make a dandy engine.

But to do the thing right you have to go all the way and get the last few little parts. And here is the reason.

Let's start from the ground up. On page 125 you'll see the shaded portion of the Ford A motor. This is the "mill" around which the other parts we can furnish are bolted to make a real plant. First, you need a real reverse gear. Nothing else will take the place of a marine type planetary reverse gear in a boat. It is the only thing which has

This shows the way the planks are laid on the bottom after the inside diagonal planking has been fastened, after the muslin is laid. Glue is laid under each plank as it's fastened.

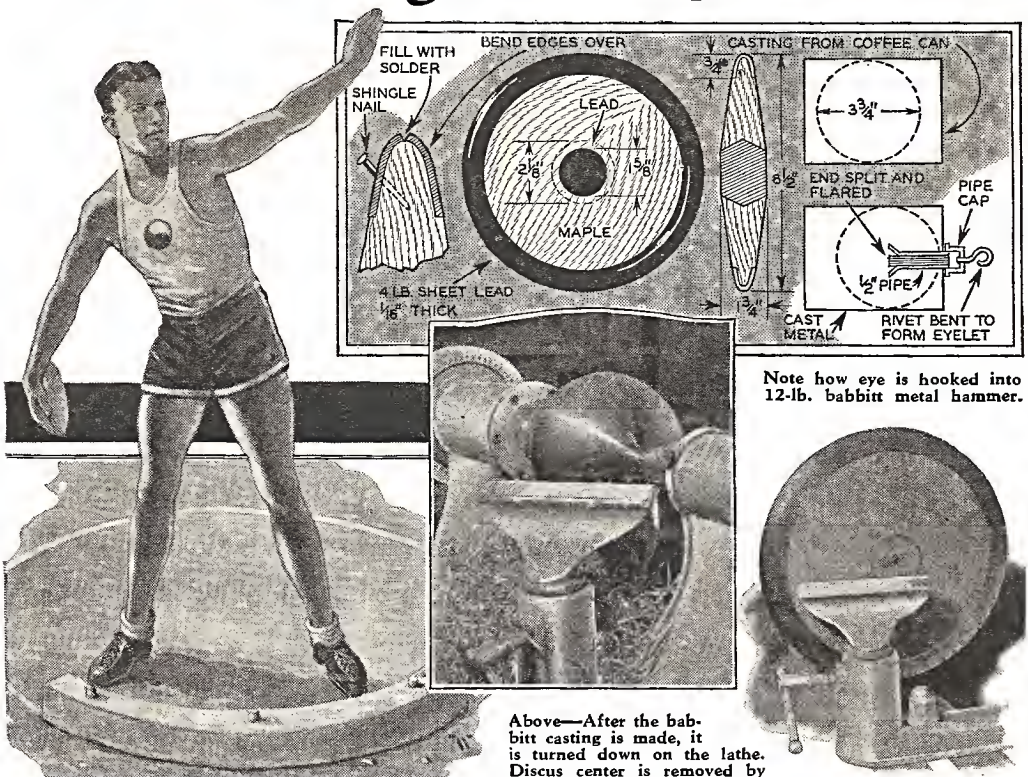
a high enough reverse ratio to give stopping and backing power.

This gear is Paragon, and costs $57.00 from the makers. We can furnish the two upper and lower housings for another ten bucks. This is the most expensive item, so I am giving you the bad news first. The rest are comparatively cheap, and are all furnished at cost. We do not want to make a profit: merely to accommodate those who can't get a fast boat any other way.

Next comes the deep sump oil base. This is bolted on in place of the stamped case that is standard with the Ford. See the drawing for explanation of this part and its function. It costs seventeen bucks, drilled and ready to install. With the gear and the base bolted on, your motor is ¾ converted.

(Continued on page 134)

Athletes—Make Your Own Shot and Discus



Note how eye is hooked into 12-lb. babbitt metal hammer.

Above—After the babbitt casting is made, it is turned down on the lathe. Discus center is removed by taking half cut from each side on face plate of lathe. Fill center with babbitt to add weight.

Above is shown the completed shot and discus. Both are correct weight for use in youngster's "sand lot Olympics."

WHEN the sand lot Olympics start this spring in your neighborhood you can be there with a few pieces of necessary equipment made in your own shop. The discus, shot and hammer are all easy, home-built projects for either profit or pleasure.

The discus shown in the drawings above is made of maple with sheet lead rim and center. Shape the block as shown and cut the rim so that when the lead is in place the metal and wood will be in line. Sand both sides and remove from the lathe.

Cut two strips of the sheet lead and bend flatways so that one edge fits the shoulder of the rim cut. Cut the ends to match carefully and solder. Then bend and solder the strip for the other side.

Drive four shingle nails through each lead strip into the wood to hold them temporarily in place. Then reinsert in the lathe, and at slow speed bend the outer edges together with a piece of wood. Cut off this surplus with a chisel until the edges just meet when the lead fits the curve of the wood rim.

With a file tang make a "V"-shaped slot in the rim, then stop the lathe and fill this with solder well built up. Remove the nails and turn the rim and sides of the metal smooth with chisel, finally polishing with steel wool.

Cut out the center as illustrated. Set the discus on a level surface and fill the bottom half of the hole with ashes, then pour the top half full with melted lead. When this has cooled, turn over, remove the ashes and fill the other half. To finish, give a double coat of clear lacquer, shellac or varnish.

For the shot used in shot putting, melt up enough scrap lead and babbitt metal in a can to give a casting from which a ball 3¾ inches in diameter can be turned in the lathe. If your lathe has a 60° dead center so much the better. Turn at slow speed with your wood chisel and oil the dead center frequently. After turning, polish with steel wool.

In the same manner a hammer throw can be made if you take the simple precaution to insert the short section of pipe in the center of the can of melted metal before it cools. Be sure that the end of the pipe has been flared so there will be no chance that it will pull out.

Fortunes Waiting for Inventors

Dealers in special lines will welcome a scale which will calculate price of material and flash it on a screen.

A compass that can be adjusted immediately to any radius without use of accessory scale is needed by draftsmen.

Many a ruined cake will be saved by the invention of a pan which will prevent the disastrous "cave-in."

As cars grow old, floor board slots which accommodate foot pedals wear and admit air. Stop this, win fortune.

Editor's note: Mr. Yates, nationally known patent expert who conducts this department, will answer questions of readers desiring advice on how to secure patents, on methods of procedure, or on ideas for inventions, when such requests are accompanied by a stamped, self-addressed envelope. Never send models as they cannot be accepted. Address Mr. Yates care of Modern Mechanix and Inventions, 529 So. 7th St., Minneapolis, Minn.

by RAYMOND F. YATES

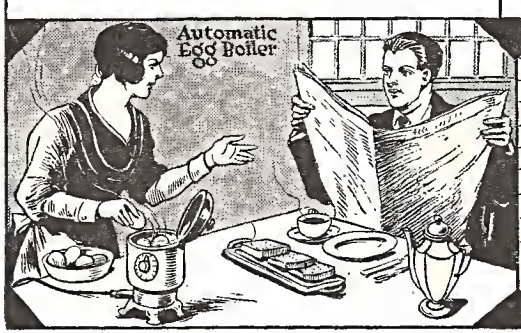
1. Price Calculating Scale

I AM going to start off with an idea that would be worth plenty if it could be done *simply*. The idea in mind is a self-calculating scale—that is, a scale that will automatically give the price of an article immediately the weight is known.

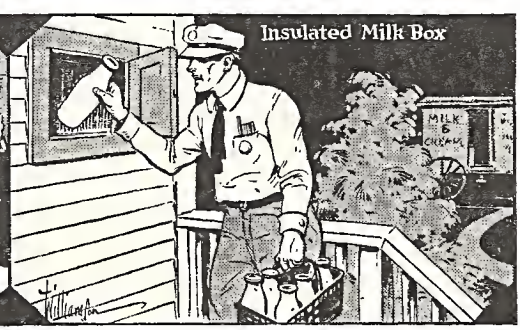
We have plenty of merchants specializing in one thing and a pound of that one thing is worth a certain amount of money. The scale should be able to make this calculation instantly in fractions of ounces. Naturally, there is price variation and the scale would have to be adjusted to meet price fluctuations but this should be simple enough.

Specifications: The price should be shown to the customer as well as to the person doing the weighing. The additional

(Continued on page 144)

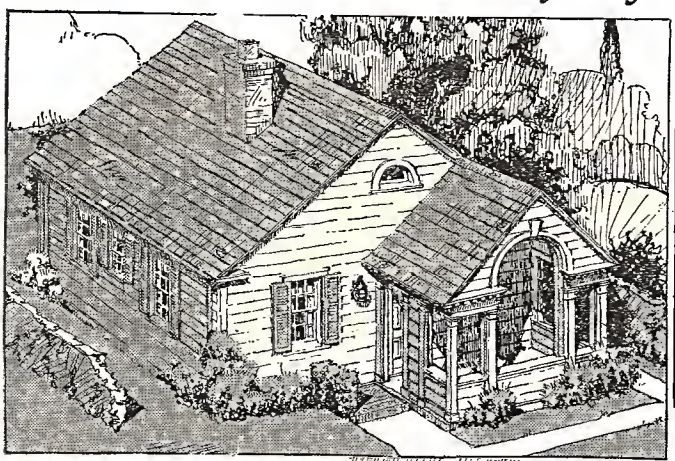


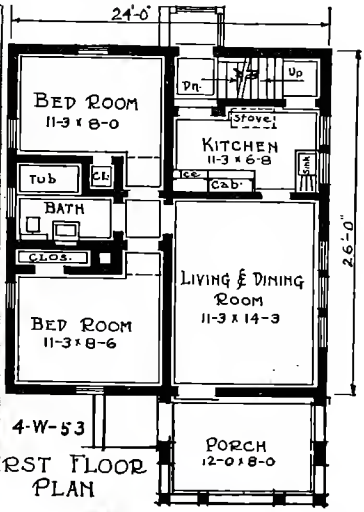
An electric egg boiler, working like automatically timed toaster, will find market among people finicky about eggs.



The modern home needs a milk box that is thief-proof and insulated against cold and heat. There's big money here.

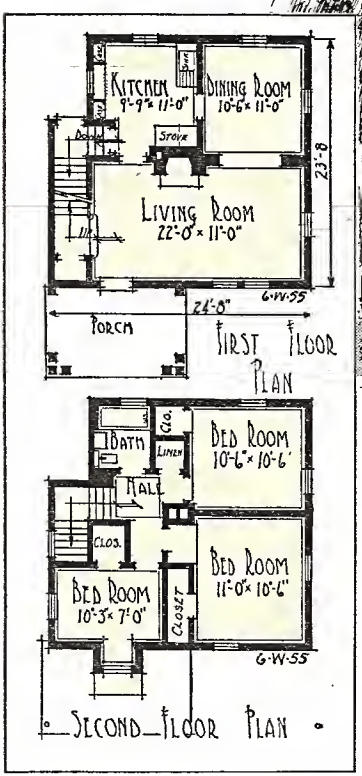
MODEL HOUSES for JUNE BRIDES



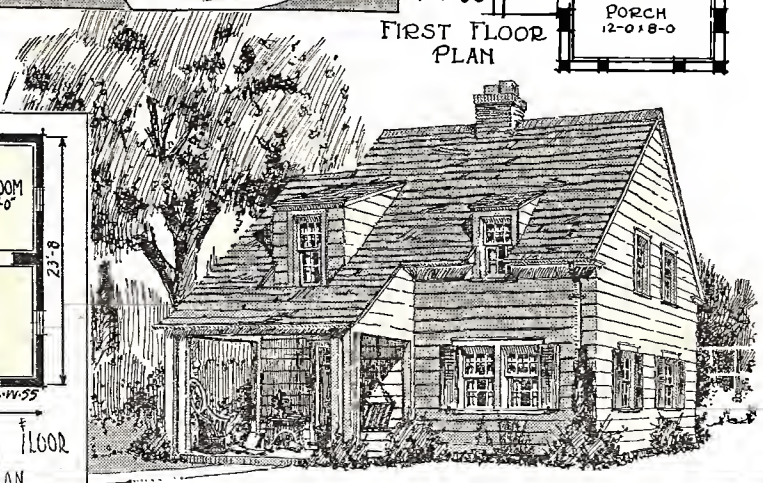


House built from plans No. 4-W-53, whose first floor layout is shown at right. The unique front porch is feature.

FIRST FLOOR PLAN



Floor plans for home No. 6-W-55, shown above. For complete blueprints for houses illustrated here send $1.00 to Modern Mechanix Home Building Editors, 529 So. 7th St., Minneapolis, Minn. Two new plan books, "32 Low Cost Homes for Newlyweds" and "16 Selected Homes for Lean Purses" illustrating time, space and labor-saving bungalows, may be had for 15 cents each, or both for 25 cents, from Modern Mechanix home building editors.



Exterior view of House No. 6-W-55, which offers six rooms, three on each floor, and bathroom. There's a full basement, insulation, and fireplace also.

by MAURICE I. FLAGG

IT WON'T be long before thousands of brides and grooms start one of life's great experiences; the fulfillment of home building dreams. To make those dreams come true in times like these requires courage plus simplicity in planning. It isn't as much of a hardship as it seems. And for those who build now every dollar will buy from 25 to 35 per cent more than in 1928 and '29. That's something to be thankful for.

The two houses selected for this issue, one a bungalow and the other a two-story dwelling, are models of simplicity. While each has been pared down to the bone to keep costs low, nevertheless June brides and June grooms will find everything they most want.

Bungalow No. 4-W-53 is, in plain words, a square box with a cover on it. Even so the proportions are good and the few details which have been added for style really make this little place quite beautiful in its external appearance.

The plan is a straightforward division of space into living and sleeping quarters. There are two good bedrooms on the first floor with space above for added

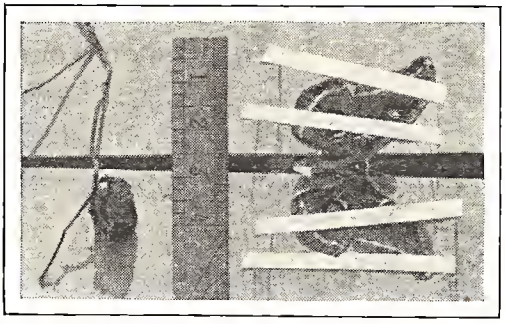
(Continued on page 136)

Season Opens for Butterflies

EVERY locality is the habitat of certain moths and butterflies which are not found in any other part of the world. This, perhaps, is what makes butterfly collecting such an interesting hobby, combined with the rare beauty of the specimens themselves, which for sheer beauty of color combinations are unrivalled in nature. Through numerous nature societies the collector may get in touch by mail with fellow collectors, and make exchanges of insects from almost any part of the world.

A net for capture of the specimens, naptha or high test gasoline for killing them, a "setting board" (which is a board with a groove through the center for the body of the butterfly to rest in while the wings are being held in position to dry and harden), and last of all a "mount," which is simply a small cardboard box filled with cotton and covered by a glass top, comprise all the equipment necessary.

Even though collecting for pleasure alone, it is always well to remember that specimens may have considerable value, depending, of course, on the size of the collection and the rarity of its specimens.



"Setting board" is grooved for insect's body; wings are held in position by strips while they dry and harden. Cocoon from which moth emerged is shown at the left.

Fascination of the hobby increases as one learns more about various easily obtained specimens. The cobra head moth of India, with a wingspread of almost a foot, has a design on its wings so resembling a cobra that the birds which are its natural enemies will not molest it.

The World War in Stamps

PHILATELISTS looking for a specialty might do well to consider the possibilities of collecting stamps commemorating various phases of the World War. So many have been brought out in the years following the conflict that the field is an extensive one. Three examples are reproduced herewith. The 1919 Jamaica one penny half penny shows the embarkation of troops; the next in order is an 8 kopeck Russian issued in 1928 on the occasion of the tenth anniversary of the red revolution; while the last example shown is Rumanian 10 lei, issued in 1931, picturing the firing of a broadside from a battleship. These by no means exhaust the possibilities, however. Bulgaria issued a series in 1931. Belgium has just come out with two stamps, one 75 centimes and the other 1.75 francs, depicting an infantryman against a background of war ruins and blazing light. They are printed respectively in red-brown and blue. Only 40,000 sets have been authorized. During the occupation of Belgium by Germany from 1914 to 1918, regular German stamps overprinted "Belgien" and new values expressed in centimes were used. These are now valuable to collectors, since they were the first occupation stamps of the World War.

Rare Confederate Half Dollar

A RECENT find of a rare coin which has aroused considerable interest among numismatists is that of a Confederate half-

(Continued on page 132)

ADLETS FOR HOBBYISTS

STAMPS AND COINS

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UNITED STATES: 100 Mixed 25c, 100 different 50c. Includes commemoratives, airmails, revenues, many obsolete. Paul Alderman, Box 341, Albuquerque, New Mexico.

UNITED STATES—Nine stamps cataloguing $1.00. Special 10c. Superior, Box 1276. Palm Station, Los Angeles, California.

PRIVATE stock, 55 diff. Canadian 70c. Approvals. H. Tardif, Box 2955, Montreal, Can.

25 U. S. STAMPS a dime, some old ones among these. The Stamp Nook, 2122 Antoinette, Detroit, Mich.

WORTHWHILE Penny approvals. Medium values likewise. Elyria Stamp Company, Earlcourt, Elyria, Ohio.

100 DIFFERENT United States Stamps 50c; 50 different Commemoratives (United States) 75c; C. Reitter, Box 329, Chicago, Illinois.

FREE Gorgeous packet including Spanish airset, triangle, map stamps, etc., to approval applicants enclosing 3c postage. Imperial Stampco, Box 215-M, Fontana, Calif.

50 FINELY Assorted Japan 10c. Hollystamco, Box 1966, Hollywood, California.

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COINS, California gold quarter size 27c; $\frac{1}{2}$ size, 53c. 3c piece and coin catalogue, 10c. 200 different stamps and stamp catalogue, 10c. Norman Shultz, Salt Lake, Utah.

40 DIFFERENT African Stamps, 10c; Lists free. Michael, 942 23rd, Bellwood, Ill.

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HOBBY DEPARTMENT

(Continued from page 131)

dollar, bearing the date 1861, of which only four were ever minted. It was uncovered by George Osmond Maher, P. O. Box 87, Baton Rouge, Louisiana, in the course of operations with a ground-radio machine he has developed for locating underground deposits of metal.

Obverse of Confederate half dollar, same as U. S. coin.

The coin has an interesting history. During the Civil War, the federal mint at New Orleans was seized by the Confederates. A new design for the coins was struck, a die was made, and the minting begun. But it developed that the dies had been cut too deeply for successful coinage, so they were abandoned after four were struck off. Mr. Maher has refused an offer of $500 for the coin in his possession.

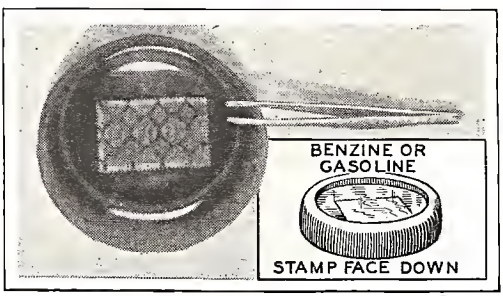
Reverse of U. S. half dollar.

The date 1861 appears on the obverse side under the same figure of Liberty seated which is on all coins of the period. The reverse side, however, instead of bearing the familiar eagle clutching an olive branch, bore a shield of seven stripes, surmounted by seven stars, surrounded by a twined wreath of cotton and palmetto and bearing the legend "Confederate States of America."

Mr. Maher found the coin in the grounds of the new state capitol of Louisiana, while engaged in locating with his ground-radio machine the metal caskets of long dead Louisianians who were to be removed to another resting place to make way for the new capitol building. At a point on the grounds where the machine indicated metal was buried, excavation disclosed a copper box filled with half dollars, as well as sword hilts and other confederate relics.

Reverse of Confederate coin.

Inexpensive Watermark Detector

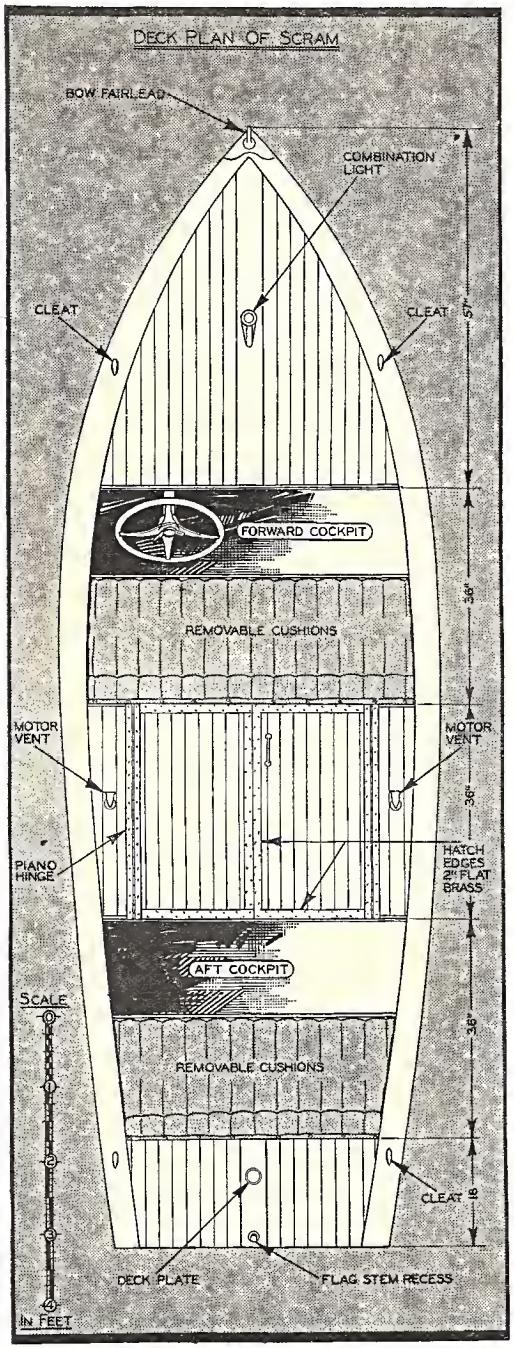


TO GET the most fun out of stamp collecting, some sort of watermark detector is required. You can easily make one for yourself, as shown in the photo above. All that is needed is a shallow glass cup, such as is used under furniture legs. Either paint the bottom and outer side black, or strip with black binding tape. Now pour a little benzine or gasoline into the cup and drop in a stamp, face down. If it is watermarked the figure will be clearly defined.

Plans for "Scram" — Part III

(Continued from page 127)

The crankshaft, as shown at B (see drawing) has a flange shrunk on it. This flange costs a



The manner in which Scram is laid out is conventional. Here are shown spacing dimensions for the cockpit placing.

(Continued on page 134)

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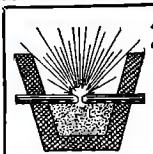

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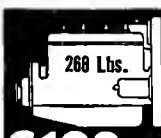

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30x4.50-21		2.15	0.85	31x4	2.75	0.85
28x4.75-19		2.20	0.95	32x4	2.75	0.85
29x4.75-20		2.25	0.95	33x4	2.75	0.95
28x5.00-19		2.60	1.05	34x4	2.75	0.85
30x5.00-20		2.60	1.05	32x4½	2.95	1.15
28x5.25-18		2.65	1.15	33x4½	2.95	1.15
29x5.25-19		2.75	1.15	34x4½	2.95	1.15
30x5.25-20		2.75	1.15	30x5	3.25	1.35
31x5.25-21		2.95	1.15	33x5	3.25	1.45
28x5.50-18		2.95	1.15	35x5	3.50	1.55
29x5.50-19		2.95	1.15			
30x5.50-19		2.95	1.15	**All Other Sizes**		
31x5.00-19		2.95	1.15			
32x5.00-20		3.00	1.25	**DEALERS WANTED**		
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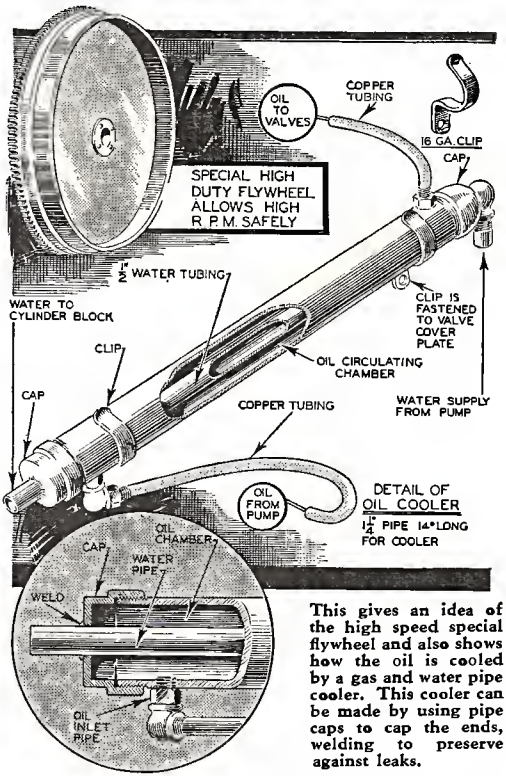
Plans for "Scram" — Part III

(Continued from page 133)

buck and a half. Onto this flange is bolted a special high speed light weight flywheel with a ring gear shrunk on it. This assembly costs six bucks.

Thus the motor is rebuilt so as to afford oil-level installation in a boat, giving a real marine drive, position of flywheel in most convenient marine placing, and we're ready for an explanation of the oiling system, which is the most fundamental operating change effected by the installation of these parts.



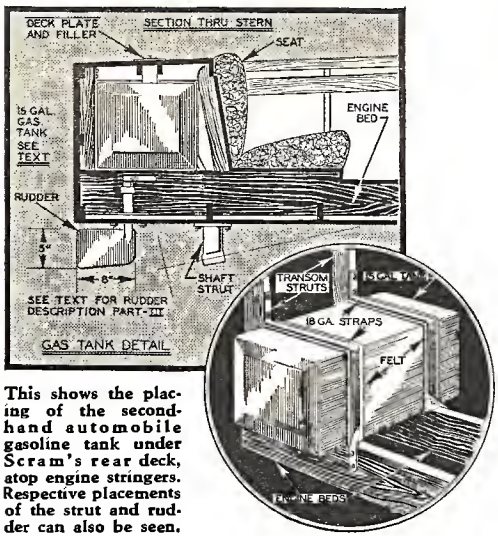
This gives an idea of the high speed special flywheel and also shows how the oil is cooled by a gas and water pipe cooler. This cooler can be made by using pipe caps to cap the ends, welding to preserve against leaks.

See the oiling diagram on page 125. The oil level in the sump is such that even though the engine is installed at 15 degrees, the surface keeps the pump covered provided the normal amount of oil is in the case. This prevents the pump from losing its prime and failing to deliver oil.

As shown on page 126 a small line is led out of the pump into an oil cooler. This cooler is merely one large pipe, sealed at the ends, through which a smaller water pipe is led to cool the oil before it enters the valve chambers.

As the oil enters the chamber it strikes a baffle plate on a small cast aluminum box (eighty cents) which feeds oil down into the front main, which would otherwise be dry unless this gadget were there to feed it. As the oil delivery is in excess of requirements for this bearing, oil slops over and feeds the other chambers and other bearing tubes. The regular Ford splash pan has provision made for it in the cast

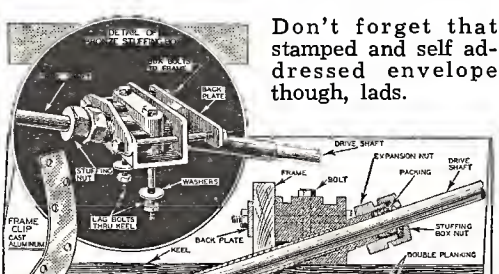
Plans for "Scram" — Part III



This shows the placing of the second-hand automobile gasoline tank under Scram's rear deck, atop engine stringers. Respective placements of the strut and rudder can also be seen.

base, and serves to conduct the oil back to the sump as well as to lubricate the con rods. This system has worked for hour after hour in wide open service. The motor shows no signs of wear after 70 hours of this kind of wide open running. If the oiling system weren't nearly perfect it couldn't do this.

A small plug is clipped over the delivery end of the pump which is inside the valve chamber. This is called the by-pass, and is plugged slightly so as to make the pressure at this delivery point (overflow from the pump into the chamber) greater than the pressure at the delivery end from the oil cooler. Thus the oil is forced to take the route of least resistance, and hence it rises by its own preference through the oil cooler and through the delivery end into the cup, where it feeds the main front bearing first. Then the surplus finds its way back into the rest of the valve chamber. We have prepared a price list of parts for the convenience of readers who want to obtain parts for this conversion. This list may be had from Sam Wing, 529 South Seventh St., Minneapolis, Minn.



Don't forget that stamped and self addressed envelope though, lads.

Diagrammatic view showing construction of semi-flexible water tight stuffing box through which prop shaft revolves.

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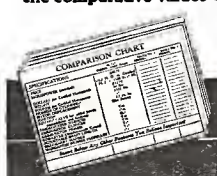

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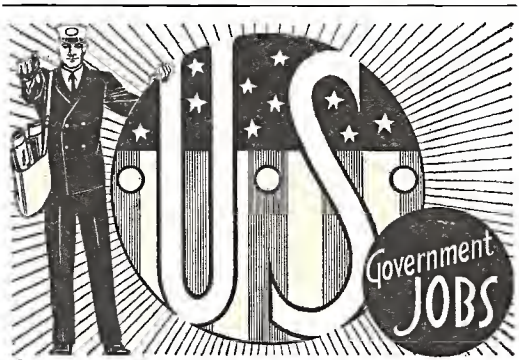

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HANDY MAN'S HOME MANUAL
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Model Houses for June Brides

(Continued from page 130)

sleeping quarters and storage. Of interest in the bathroom is the setback tub with alcove effect.

The house can be placed on a 35 ft. lot. There's a full basement. Paint this house white and trim it with green blinds and green window sash and give it a setting of green lawn and colorful shrubbery and you'll have as good looking and at the same time as inexpensive a little house as you can ask for.

The designer says that $3250 is a fair price range. Perhaps less with present day prices for materials.

House No. 6-W-55 offers six rooms. Three below and three above, with bathroom. A feature is the open stairway from living room to second floor. This plan is probably one of the most popular of all plans for small two-story dwellings. There's not an inch of waste space anywhere.

The inside fireplace means economy in construction and while the porch is an open one it can be glazed and used for living purposes. There is a full basement and complete insulation.

An approximate cost is $5000 according to the designer. This will vary, depending upon location and equipment.

Air Camping Ideas

(Continued from page 101)

motor cover in your kit and also a cover for the rear cockpit. The front cockpit is sufficiently protected by the wing. These covers are not absolutely essential but are good things to have. Whatever form of tent is used do not pack tent pegs or a tent pole. This is useless weight as they can be easily cut at the camp site.

For this and other purposes it is necessary to include a small hatchet in your kit—the lightest practical one you can find. A grid, aluminum frying pan, coffee pot and cups and plates should also be included. Any good supply house will furnish a wide selection of lightweight space saving camp utensils which are just the thing for an air camping trip. Food and such things can be carried in the front cockpit with the passenger and it would be sensible to include a thermos bottle of water. A gasoline camp light will be found handy—it can be filled from the ship's gas supply and gives a brilliant light.

A collapsible canvas bucket is something which takes up practically no space and is indispensable. Other things such as fishing gear, etc., are open to the individual camper's ideas but even in this direction it is well to keep the weight problem in mind and limit the gear to what is necessary.

The bulkier objects can be stowed away into the stowage compartment and as mentioned above, food and smaller objects placed in the front cockpit with the passenger. If pilot and passenger do not greatly exceed one hundred and fifty pounds apiece the Pietenpol Air Camper with the Ford "A" motor will carry about forty pounds of camp gear without trouble. This may not sound like a lot of equipment but with intelligent selection a quite comfortable kit for two people can be carried.

The selection of a camp site is limited to a great extent by the necessity of having a suitable place to land. To have to carry the camp gear any distance would take some of the steam out of the trip and there would be also some worry about leaving the plane any distance from the camp. But it should be easy to spot from the air some suitable place which not only afforded landing space but provided camping possibilities. The great thing of course would be to have amphibian landing gear but it would be asking too much of even a Ford "A" to lug the additional weight of such a gear.

Origin of Terrifying Dust Storms

(Continued from page 73)

The total amount of solid matter thus carried over the earth by the winds is probably even greater than that transported by water. Prof. J. A. Udden, from his studies of dust storms in the United States west of the Mississippi, estimates that on an average about 850,000,000 tons of dust are carried in that region by the winds 1,440 miles each year, so that the total dust transport for the region amounts to 1,225,000,000,000 "mile tons."

Udden also estimates that in general, over this region, there is an average annual deposit of dust amounting to not less than 0.01 inch, or an increase of one inch a century in the elevation of the land surface resulting from dust deposits. For the amount of solid material suspended in the air during sand storms and dust storms Udden gets figures ranging all the way from 160 to 126,000 tons per cubic mile of air.

Last January a shower of muddy rain fell in Chicago. Microscopic examination of the mud and a study of weather maps showed that the deposit consisted of soil blown up from the plains of Kansas. In March, 1918, a shower of dust discolored snow at various places in the United States over an area of at least 100,000 square miles, extending in an east-west direction from Dubuque, Iowa, to Chelsea, Vermont.

A study of this shower was made by Messrs. Miller and Winchell, of the University of Wisconsin, who estimated that the amount of dust could not have been less than a million tons and may have been several hundred million. The dust came from the arid regions of the southwestern United States, and some of it was carried more than a thousand miles. In all such cases of long-distance transport the dust is carried, by rising air currents, to high levels of the atmosphere and may thus travel in a direction quite different from that of the surface winds.

On April 25-26, 1928, a great storm raged over the dry steppes of southern Ukraine, blowing up such dense clouds of dust that day was turned into night. Such events are known on the Russian steppes as "black storms."

Information collected from about 700 places by the Ukrainian Institute for Applied Botany indicates that something like 15,400,000,000 tons of earth was swept up from the soil. The greater part of this was deposited within the Ukraine, but during April 26-30 about 2,000,000 tons fell over an area of 28,500 square miles in Rumania and 1,500,000 tons over an area of 42,500 square miles in Poland—one of the most remarkable dust-falls in history.

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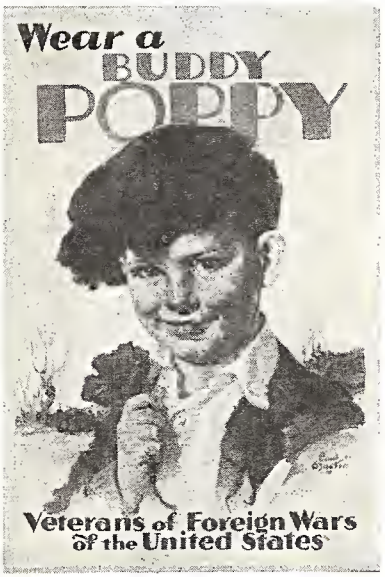

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How to Build Your Own Truck

(Continued from page 107)

The outer end of the extension bracket is bolted to the side-rail with one ½-inch SAE machine bolt running through a spacer sleeve. This spacer consists of a length of ½-inch pipe cut just a trifle long and filed on the ends until it is a light drive-fit into place, preventing distortion of the side-rail upon tightening the thru-bolt.

In most installations the upper bracket strip will be straight and the lower strip bent up to meet it, as shown at Figure 2.

Steel saddles made from ½-inch machine steel bent to fit are welded to the top of the rear spring clips. These saddles, two in number, form bearing surfaces for the overload spring ends, and should be as wide as the distance between the outside edges of the spring clips to which they are welded.

The overload spring should be placed so that its ends are 1 to 1½ inches above the bearing plates when the truck is unladen.

Weld the extension brackets to the frame side-rails after the installation is correct. This prevents "working" of the parts and possible failure. Do not weld the hanger to the brackets or it will be almost impossible to remove the spring in case of breakage. Electric welding is best for this work.

Sufficiently long leaves should be added to the rear springs to enable them to support 900 to 1,000 pounds payload before the overload spring comes into action. Two extra leaves in each rear spring are ordinarily sufficient; one each second and third leaves. Deeper spring leaf-clips will be necessary after adding leaves. The spring clips proper are usually long enough to permit adding the extra; if not, longer spring clips can easily be made from round machine steel of the proper size. Re-tighten the spring clip nuts after driving a few miles to "set" the springs.

Body

The next step in the conversion is providing a suitable body to carry the payload. A simple platform style of body is best for most purposes; but the choice of body will depend entirely upon the preference of individual constructors. Construction data for a platform body 6½ feet long and 6 feet wide is given in accompanying illustrations. For bodies of other dimensions the measurements will have to be altered proportionately.

This body consists primarily of two filler beams, two main beams, a sufficient number of cross timbers and 1x6-inch floor planking. A head-gate is made from 1x3-inch timbers bolted to angle iron uprights.

The filler beams are tapered wooden beams, one on each side, cut to fit between the back of the front seat and the rear frame arches. These beams rest on top of the frame side-rails and are 2 inches wide and high enough to provide a level foundation for the main beams.

After being cut to size the filler and main beams for each side should be bolted together with length of 1-inch angle iron at the cross timber stations, as shown, and clamped in place to the side-rails with long U-bolts.

These same lengths of angle iron also secure the 2x4-inch cross timbers and should be located to place the cross timbers in the correct posi-

tion. In no case should the cross timbers be more than 24 inches apart.

The front cross timber should be located 1 inch aft of the rearmost part of the front seat to allow space for the head-gate.

It should be noted that the cross timber over the rear axle is cut short and fitted with an angle iron extension to avoid interference with the rear tires.

All floor planking is 1x6-inch timbers nailed in place. The two outside planks are nailed and bolted in place. A length of 2x3/16-inch angle iron is bolted to the rear edge of the floor planking to prevent splitting.

When building the body two items are of paramount importance. First, sufficient clearance must be allowed between the top of the rear tires and the nearest portion of the body to prevent fouling the tires when laden. If tires of the same or smaller overall diameter will be used on the rear wheels allow the same clearance distance originally between tire and fender. If tires of greater overall diameter are used the wheel clearance must be increased accordingly.

The second important consideration is to proportion the body so that the half aft of the rear axle is not more than 6 inches longer than the half forward of the rear axle. In other words, the load must be fairly evenly balanced over the rear axle.

In some cases the body may interfere with filling the gasoline tank. When such is the case the gasoline tank can be removed from its position at the rear of the frame and mounted either on the running board or to the side of the body proper. Mount the tank as far forward as possible and on the carburetor side of the chassis to obtain the shortest possible gasoline line. Clip the gasoline line to solid parts at intervals to prevent vibration.

Watch Width of Body

The width of the truck body is largely a matter of choice. However, it is not advisable to use a width greater than 84 inches (7 feet). In many states clearance lights are required for night driving with bodies beyond a certain width, usually 80 inches. Clearance lights usually consist of two small blue lights placed on the extreme left side projection of the body, one at each end, visible from front, rear and left side.

Below are given the carrying capacities, inflation pressures and other data for high pressure and balloon heavy duty tires.

High Pressure Tire Size	Wheel Size	Rim Size	No. Plies	Overall Diameter	Carrying Capacity	Inflate to Lbs.
32x4	24"	4"	6	33.7"	1,000 lbs.	65
32x4½	23"	4½"	8	33.8"	1,250 "	70
33x4½	24"	4"	8	34.5"	1,250 "	70
30x5	20"	5"	8	32.6"	1,700 "	80
33x5	23"	4½"	8	35.4"	1,950 "	80
34x5	24"	5"	8	36.6"	1,950 "	80
35x5	25"	4½"	8	37.4"	1,950 "	80
32x6	20"	5-6"	10	34.69"	2,200 "	90
Balloon						
6.00—20		4½"	6	32.58"	1,350 "	45
6.50—20		4½"	6	33.77"	1,500 "	45
7.00—20		5"	6	34.98"	1,900 "	55

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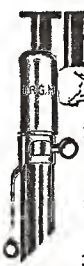

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How to Build Your Own Truck

(Continued from page 139)

To select the proper tire size for the truck it is necessary to first find the unladen weight on the rear axle by weighing the rear of the truck. To do this, the unladen truck should be driven on a platform scale, with the center of the truck over the edge of the scale platform, and the rear wheels only resting on the scale. The weight indicated on the scale is the unladen weight carried by the rear tires.

How to Figure Weights

We can safely assume that the total payload weight will be carried by the rear axle and tires. To the unladen weight of the rear axle add the total payload weight. The sum obtained will be the maximum weight carried by the rear tires. Dividing this sum in half gives the weight carried by each rear tire.

Thus:—Suppose the rear axle unladen weight is 1,400 pounds and the payload will be one ton —1,400 plus 2,000 is 3,400; dividing by 2 gives a quotient of 1,700 pounds, or the weight carried by each rear tire when the truck is laden.

Referring to the table of tire data we find that either a 5-inch high pressure or a 7.00 balloon tire will be necessary to support this weight.

If the converted truck is already equipped with "20-inch" wheels and 4½ or 5-inch rims we can use either 30x5 high pressure or 7.00—20 balloon tires.

High pressure tires are recommended for converted jobs because of their greater side clearance and smaller overall diameter for a given carrying capacity and wheel size. So the 30x5 would be used.

Tire Diameter Important

If the truck will be used for mountain work, or under any condition where maximum power is required, the tire diameter should be kept as low as possible—less than the original tire size diameter if possible. This does not mean a tire of greater carrying capacity cannot be used, but rather one of smaller overall diameter. To do this it will be necessary to equip the truck with smaller wheels.

This is ordinarily a simple task. Practically every car large enough for conversion has at some time been equipped with demountable disc wheels. "Twenty-inch" disc wheels can usually be secured to fit the original disc hubs. Such a changeover can be worked out for nearly every car. If 20-inch disc wheels cannot be secured perhaps 21 or 23-inch can be obtained. Decreasing the rim size 1 inch will permit increasing the tire width ½ inch without appreciable increase in overall diameter.

Watch the oil pressure when descending a grade under compression; loss of oil pressure indicates that the oil level is low and should be looked to at once.

After the truck is completed it will probably be necessary to re-license it as a commercial vehicle before it can be legally operated; unless its unladen weight is less than the minimum for commercial vehicles. In California, for example, any commercial vehicle weighing less than 3,000 pounds unladen may be operated under a passenger car license and without its operator being a licensed chauffeur.

Nothing will be gained by overspeeding the

truck except large repair bills. Thirty miles per hour maximum when laden is amply fast.

The truck should always be provided with a dependable fire extinguisher of at least one quart capacity. Fire insurance is a fine thing, but it will not save your truck and load, should it become afire remote from assistance—a good fire extinguisher will.

Machines for Placer Miners

(Continued from page 82)

sometimes the dry earth is put in a blanket, tossed and wind-washed, the larger chunks being hand sorted. In any case, separating gold from a dry placer dirt requires that the dirt must be fine, must be perfectly dry, and ready to separate from the gold by air action.

This gives a very sketchy, but fundamental, survey of how the small operator may get into profitable mining. The actual prospecting equipment costs less than $5. Another $15 or $20 will build a rocker, sluice or tom from which a real "stake" may be made. With a few hundred dollars thus built up it is possible for the small operator to put himself in the way of making a neat little fortune by purchasing one or several portable placer machines with the money he has made from cradle or sluice. Or he may find a larger placer, of lower net values per yard, which, if thoroughly proven, will interest capital and bring him good returns.

One word of warning. Prove your property before you plunge into any sort of an operation involving outlay of cash. Know, positively, how much or how valuable dirt you have by testing it back and forth, top and bottom. Not until you do this can you be sure that you are ready to apply the best methods to that particular piece of ground.

In the next and final article of this series, we will consider the possibilities that open if you follow up the gulch that shows placer gold and by diligent search locate the vein from which that gold is coming. Few will do this; but among those who do someone will "strike it rich."

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29x5.25-19	2.75	1.15	30x6	3.25	1.35
30x5.25-20	2.75	1.15	33x6	3.25	1.45
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How to Build a Diving Helmet

(Continued from page 99)

when above the surface, and is closed before diving. It consists of a piece of sponge rubber about 1 by 1 by 6 inches, backed with a piece of metal, and arranged to rotate on a bolt set in the center of the top surface of the helmet. Two holes are punched through the top of the helmet in such a position that the sponge rubber will completely cover them when you are ready to dive. Otherwise, the sponge rubber will be turned so that the holes are uncovered and air is admitted. The bolt has a thumb screw nut to clamp the rubber tight against the metal. A stop pin may be added to help you to tell when the valve is closed.

In addition, a ring should be bolted and soldered to the top of the helmet for a lifeline.

The exhaust valve, which lets the air stream out continuously, keeping it fresh, and equalizing the pressure between the air inside the helmet and the water outside, is located to one side of the window, **below the level of your nose.** On regulation helmets, the air supply comes in below and goes out above which makes for good circulation, that is true; but we don't want the helmet to fill with water if the air supply is momentarily cut off, so we make this change. The valve consists of a ½-inch hole in the can with a leather tab covering it on the outside, which flaps down, closing the opening when you inhale and doing the opposite when you exhale.

A heavy elastic strap holds the can on; and it must be heavy because a can of this size when full of air has tremendous buoyancy. The strap should be about 36 inches long; try it before cutting to allow for differences in build. To each end should be securely bolted a 3-inch strip of iron. One of these metal tabs will have a quarter-inch hole bored through it, and the other will have a 3/16-inch bolt or rivet passed through it and protruding about half an inch. The two tabs fit over one another, the hole taking the peg, to form a quick-release buckle for the strap. The strap passes through slits in the back of the rubber sheathing, passing **over** the rear bracket at the mid point of the strap.

This strap must be just long enough to reach once around you, under the arms where it will not interfere too much with your breathing, cross in front, go back over the metal shoulder brackets, cross again in back, come around and buckle in front. The strap should be pulled quite tight so that the helmet is held down securely.

Your diving helmet is now completed. Connect a good big air pump to the rubber hose, the biggest pump you can find. An ordinary tire pump does not furnish enough air even when it is worked at top speed. Two or three used together will work, but of course this takes several men in your surface crew. With the pump you should use an inner tube with an extra valve stem for each pump, the air compressing in the tube and then going out to the helmet. Of course you must take the valve "insides" out of the exit stem so that the air will escape to the helmet. This inner tube **must be mounted up in a casing and rim;** otherwise the inner tube will only blow up from the pressure.

How to Build a Diving Helmet

Now to dive. Use a sack full of rocks to anchor your boat or raft; and when you dive, climb down the anchor rope, holding yourself in a vertical position by keeping your feet around the rope. You must keep in an upright position all the time, never stooping over. If you do bend over, the water will fill your helmet, for it is kept from coming in only in the same way that a glass held inverted under water will remain full of air. If you must pick something up off the bottom, squat down, but keep your head up.

Don't tie weights to yourself. Always go down the anchor rope and if necessary to walk around, carry the anchor with you. The rope will lead you right up to the boat, where you will have something to grab hold of when you reach the surface.

Don't dive too deep. Stay under thirty feet for most of your dives, for at this depth you will not have to fear the "bends," and you can come up just as fast as you wish. Only, don't try to dive if you have a cold in your head. If you do, the pressure will not equalize between your nose and your ears, and you will feel a great pressure on your eardrums. If you have no cold you can swallow repeatedly as you dive and equalize this pressure.

Remember: don't bend over, don't tie any weights to yourself, and don't go too deep.

O. K.?

Going down!

Hawaiian Water Sled Easy to Build

(Continued from page 118)

marine glue and ¾-inch cloth tape. When closing the seam, first put a layer of glue, then the tape, and lastly another application of glue before the deck is screwed tightly down.

In either the bow or stern block a 2-inch deck plug with an air lock is inserted to allow for ventilation, drainage, and air expansion. A hole drilled into the inner end of the block will connect the valve with the great air chamber. It should be remembered that, immediately after using, the valve of the water sled must be opened to release air which ordinarily has expanded, especially during a hot day. Otherwise, there is a chance that the bulging decks may tear loose the screws from the rails.

If you care to add another air lock (which may be a valve from an auto inner tube) you can put an inner tube in the sled which will keep it afloat if you smash it against rocks or wreckage while you have a cargo on it which must be supported. Sketch on page 118 showing artist pumping up inner tube does not mean sled itself is inflated. There would be no point in doing this. The original air lock is there to equalize the pressure inside and outside the sled.

For protection against water which may have seeped into the hollow board, the inside should be treated with oil, paint, or other preservative. The outside, naturally, is best finished with marine paint covered with several coats of spar varnish. It will pay an owner of a water sled, especially where salt water is his highway, to wash his decks with fresh water after an excursion and then dry them with a towel. Like a fishing rod or the deck of a yacht, the board may require frequent coatings of spar varnish.

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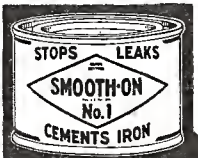

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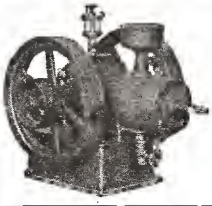

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Fortunes Waiting for Inventors

(Continued from page 129)

cost of manufacturing such a scale should not be over three dollars.

Exploitation: This invention should be patented in the leading countries of the world and it should be sold outright to one large manufacturer for $50,000.

2. An Improved Compass

There is a problem in connection with a compass that is crying for solution and that would make of this simple thing a tool of far greater utility than it is today.

I refer to a compass that would be adjusted for circles of varying diameter without the necessity of using a scale or ruler for the adjustment. In other words the compass could be calibrated so that instant adjustment to any radius would be made without the use of any accessory measuring device. The scale would be a part of the compass. Sounds simple, but where is such a thing? It has still to come.

Specifications: Must be extremely accurate above all and it may cost twice as much as the present instruments although cheapness is a factor. It should not be cumbersome.

Exploitation: It should be sold outright for the sum of $15,000. Should be patented in the six leading countries of the world.

3. Shock-proof Cake Pan

Millions have been earned by fellows clever enough to recognize simple needs of the housewife. Take the matter of baking cakes for example. In baking a cake, a lady is haunted by two possibilities that make cake mortality high. One is the possibility of the cake "falling"; the other is the burned bottom.

It would seem that inventors could do something about this. What is needed is a "fall-proof" and "burn-proof" cake tin. Cakes fall because they rise too fast and because they are *subject to vibrations that come up through the floor.* Why not have a double-bottomed tin suspended in some way that would insulate it from floor shocks?

Sounds simple and it is simple. Give mother a cake tin that will be 100% and will she buy it? Just give her a chance.

Specifications: Should not cost over 100% more than the present cake tin and should not be complicated or require special instructions. It may be made only of pressed metal.

Exploitation: Should be patented in every country where cakes are eaten. Should be sold strictly on royalty.

4. An Automobile Problem

The manufacturers of automobiles are trying to make winter driving more comfortable and anti-draft systems are the big drawing cards of the day, together with hot water heaters. There is still another problem, however, that must be licked before winter driving will be the thing that many people wish for.

Try as we will, we do not appear able as yet to seal properly the slots in the floor boards that accommodate the brake and clutch pedals. When

a car is traveling at high speed, there is a great inrush of cold air from this source; air that chills the driver's feet and rushes up his pant legs. In the summertime, the hot, oily air from the engine enters from the same source.

Here is a fine problem just crying for some solution. It would be an enormous selling feature for a car and I predict that the man who hits upon the winning idea will never have to work again.

Specifications: Should seal these points perfectly and should NEVER wear out. The method should be simple and should not cost over $1.00 American money.

Exploitation: Should be sold outright to the highest bidder and on a purely competitive basis. There will be plenty of bids for the right kind of an article.

5. Boiling Eggs Electrically

Here is a problem for those of my readers who like to fuss with electrical projects. Some years ago, a clever fellow invented an automatically timed bread toaster and the idea was a whale of a success. Several million were sold and are still being sold.

There is another idea along the same line that is begging for solution and would make the same kind of a sensation. Why not an automatic egg boiler that would accommodate, say four eggs, and that would eject each individual egg when it had been boiled the proper length of time? It would not be necessary to evolve an elaborate thermostatic system to do this. The problem can be solved in a purely mechanical manner as was the electric toaster.

Specifications: Should be cheap enough to compete with electric egg boilers now on the market and should as far as possible be made of pressed metal.

Exploitation: Should be sold outright and should bring at least $20,000

6. Improved Milk Box for Houses

The milk compartment built into modern homes is far from being a satisfactory arrangement. In the winter time when the milk man leaves the milk, it freezes before the family gets down to breakfast. On the other hand, if the box is left open, the house will get cold and then there is the possibility of thieves gaining admittance.

We need a milk box in which the milk man may place the bottles and by some sort of a revolving door cause the bottles to reach the interior of the house. Once the door is closed by the milkman, it should be impossible to re-open it from the outside. This feature would make it necessary for a member of the family to re-set the device so that the milkman could re-operate the door the next morning. Such a scheme would prevent the milk from freezing and bring greater security to the household.

Specifications: Should be made of heavy pressed steel and should not have over a dozen parts. Should not cost over five dollars retail.

Exploitation: Should be patented only in this country where the house milk box is used.

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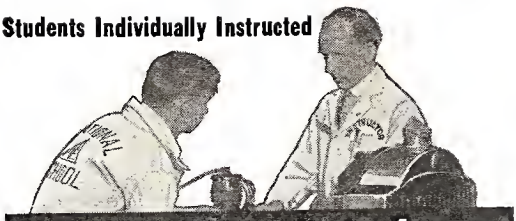

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ROSICRUCIAN BROTHERHOOD

San Jose (AMORC) California

Build a Model Side-Wheeler

(Continued from page 113)

the jackshaft is also shown in the plan view.

There is quite a little work on the paddle wheels, but nothing difficult about making them. The hubs in this model were whittled by hand (we have no lathe) and sanded to a fairly round shape. In making them, first bore the shaft-hole *with* the grain, and with this as a center make compass circles at either end 1½" diameter and trim down to them. Now mark the ends for eight evenly spaced paddles. The latter are made from cigar-box lids nearly ¼" thick. They are attached to the hub by means of two small nails or brads which are driven into the hub and heads cut off afterwards. The paddles are forced down on the headless nails.

To hold the paddles in position, cut a circular piece of tin, as shown, and solder the ends together. This ring is needed on the outside of the paddle wheel only, and keeps the paddles evenly spaced as well as reinforces the entire unit. The paddle wheels are keyed to the shaft by means of a nail driven through a slot in the shaft. Swelling from dampness soon tightens them even more.

Set the paddle wheels to work at about the depth of the hull. This is the correct depth for the width of blade, pulley-ratio and size of engine in the original.

When tests are satisfactory, go ahead with the superstructure. Make a detachable roof in one piece of ¼" white pine with slots for large pulley and for engine belt, and opening for the engine. These are best located by actual fitting. Around the engine room a raised section is built, having a tin roof cut to slip loosely over the engine. This latter is also a matter of fitting to your job.

A curved tin roof is put on the pilot house for effect. The forward windows are square, built up as indicated, and one porthole bored in port side (always before assembling) and a door cut in starboard.

Make the funnel from a tin can about 2¾" diameter, screwed to the roof. This, of course, is a dummy funnel, but serves a real purpose in detracting from the prominence of the engine which any young mariner knows has no business sticking up through the roof like that.

Lifeboats were purchased from a ten-cent store —infinitely better than trying to whittle them out. They are lashed to cradles by cord through screw eyes, and "stay put" when the roof is lifted off for refueling.

1000 Ways to Make a Living

(Continued from page 69)

so that she now employs two other girls and gives 24-hour service.

Good One For Women

Obtaining from teachers the names of pupils in schools from the kindergarten to the fifth grade, one woman, sent a note to each mother saying she would mend anything, darning school stockings a specialty, at a modest price. She figured correctly that the age groups represented would be those of youngsters hard on clothing. Her business has now expanded to include all sorts of mending, from torn wedding veils to broken dolls.

Bartering For Profits

The New York owner of a small truck has developed an occupation through his own efforts which keeps him self sustaining. He picks up boxes, barrels, bags and cans from stores and wholesale houses, which he takes home and cleans thoroughly. Then he goes out into the country and swaps them for chickens or farm produce. Farmers' wives like the lard and butter tins for preserving meat, and other containers are welcomed for numerous purposes. As a sideline, he runs errands in town for the farmers.

Providing Garden Plots

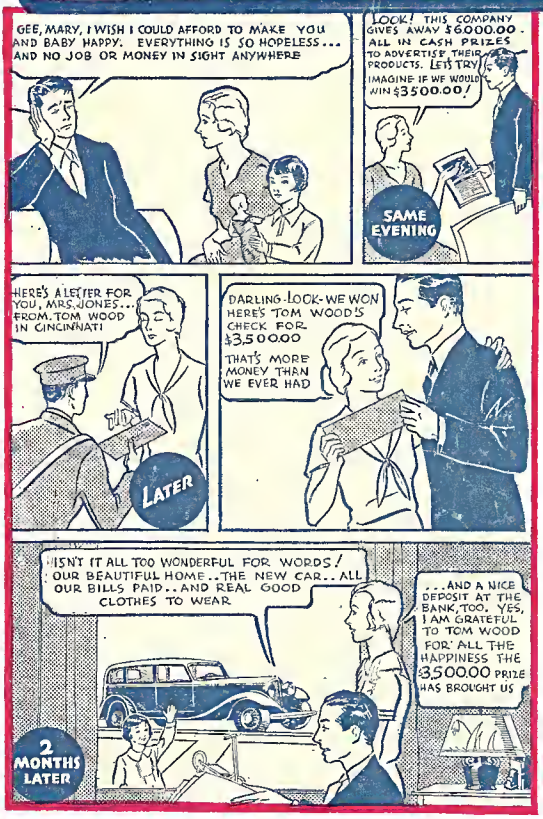
Many large industrial firms, hit by the depression, are trying to help idle employees by providing space in which they can raise vegetables and necessities for the larder. One man contracted with a large firm in his city to provide garden plots for the season at $2 per plot. He was able to secure the ground at a nominal figure from a real-estate firm whose developing activities were halted by the depression. He staked off 50x100-foot plots, plowed and harrowed them with an old tractor, and received a substantial income during the growing season.

HIGH BLOOD PRESSURE

Quick Relief, or You Only Pay When Satisfied

If you suffer from High Blood pressure, dizziness, ringing in the ears, can't sleep at nights, feel weak and shaky, bad taste, nervous. If your heart pounds and you fear a paralytic stroke, to demonstrate the value of Dr. Hayes' successful prescription we will send you postpaid, a regular $1 treatment on absolutely FREE TRIAL. While it is non-specific, many cases report remarkably quick relief; often symptoms diminish and quiet normal sleep returns within 3 days. Contains no salts, physics, opiates or dope. Absolutely harmless. You can continue with treatment you are taking. It cannot conflict. Perfectly safe with any diet. PAY NOTHING UNLESS GREATLY IMPROVED. Then send $1. If not your report cancels the charge. Write to Dr. Hayes Assn., 2580 Coates House, Kansas City, Mo.

What Will You Do With $3500.00 cash If I Give it to YOU?


GEE, MARY, I WISH I COULD AFFORD TO MAKE YOU AND BABY HAPPY. EVERYTHING IS SO HOPELESS... AND NO JOB OR MONEY IN SIGHT ANYWHERE
LOOK! THIS COMPANY GIVES AWAY $6000.00 ALL IN CASH PRIZES TO ADVERTISE THEIR PRODUCTS. LET'S TRY! IMAGINE IF WE WOULD WIN $3500.00!
SAME EVENING
HERE'S A LETTER FOR YOU, MRS. JONES... FROM TOM WOOD IN CINCINNATI
LATER
DARLING-LOOK-WE WON HERE'S TOM WOOD'S CHECK FOR $3,500.00
THAT'S MORE MONEY THAN WE EVER HAD
ISN'T IT ALL TOO WONDERFUL FOR WORDS! OUR BEAUTIFUL HOME...THE NEW CAR...ALL OUR BILLS PAID...AND REAL GOOD CLOTHES TO WEAR
...AND A NICE DEPOSIT AT THE BANK, TOO. YES, I AM GRATEFUL TO TOM WOOD FOR ALL THE HAPPINESS THE $3,500.00 PRIZE HAS BROUGHT US
2 MONTHS LATER

I'LL PAY $250.00

Just for the winning answer to this question

I am going to give $3,500.00 to some deserving man or woman who answers my announcements. *You may be the one to get it!* But, before I give it to anyone I would like to know that the money will be used wisely. *What will you do with this fortune if I give it to you?* Just answer this question—tell me in a sentence of 20 words or less what you would do with the $3,500.00—*nothing more to do toward the $250.00 cash prize!* Sounds easy? It is easy! Nothing "fancy" is needed—just tell me in plain words what you would do with the $3,500.00.

20 Simple Words Win $250.00

Nothing more for you to do! Costs nothing to win—nothing to buy—no selling. This $250.00 Prize given just for an answer to my question.

There is no way you can lose. Simply tell me what YOU will do with $3,500.00 if I give it to you. The prize for the winning answer is $250.00. Just sending an answer qualifies you for an opportunity to win $3,500.00 in final prize distribution. Think what an amazing opportunity—why, many people work hard for a life-time without ever having such a vast amount of money as you may now win.

RULES:—Only one answer accepted from a family. You must be over 16 years of age and reside within Continental U. S. $250.00 given for best answer to "What Will You Do With $3,500.00 If I Give It to You?" Answers must be postmarked not later than Sept. 16, 1933. Judges will consider answer only for practical value of the idea. Construction, spelling, and neatness not considered.

Just Sending Answer Quolifies You for Opportunity to

WIN $3,500.00

Some say I am wrong. They say that the people who get money from me will spend it foolishly. Now I want to find out. I am going to give away over $6,000.00. Someone is going to get $3,500.00 All Cash. If I gave you the $3,500.00 what would YOU do with it? Tell me in 20 words or less. **Think, NOW, How You Would Spend $3,500.00!** Would you start a business—invest in bonds—pay off a mortgage, or buy new furniture? Just sending an answer qualifies you for the opportunity to win $3,500.00. If you are prompt I'll send you a $1,000.00 Cash Certificate AT ONCE! Here is an opportunity of a lifetime. Rush your answer today. Yours may be a winner.

TOM WOOD, Monager
Dept. W-53-F, H-O Bldg., Cincinnati, O.

PROMPT! . . . I Will Send You $1,000.00 Cosh Certificate AT ONCE! One thousand dollars EXTRA if you are prompt and win first prize in final distribution. So don't delay. Every person who takes an active part will be rewarded in cash . . . Write your answer and rush it to me. Use coupon and send in letter or on one-cent post card. Send no money. I will send you $1,000.00 Cash Certificate at once.

YOUR PRIZE COUPON

TOM WOOD, Manager,
H-O Bldg., Dept. W-53- F, Cincinnati, Ohio.
If you give me the $3,500.00 prize, I will use it as follows:
(Write your answer plainly in here, in 20 words or less)

.....

.....

.....

.....

NAME .....

ADDRESS .....

TOWN..... STATE.....

. . His Harvest Years Made Miserable

Through Failure of the

DANGER GLAND*

That Wrecks Many Men After 40!

..yet This Little Book Might Have Saved Him Years of Needless Pain!

DEEP in the body of every man lies a tiny gland—the prostate. Every year, in thousands of men, this gland becomes so seriously swollen and inflamed that the victims, who should be vigorous, healthy men, become physical wrecks. Pains in the back and legs—peculiar headaches they can't account for—frequent need to get up at night all warn them that something is the matter. Yet they fail to heed. They think the night rising is a symptom of "bladder trouble" or "a sign of advancing age."

Competent medical authority says that 65% of all men past a certain age suffer from these symptoms—are actively victimized to some degree by this gland. Thousands of men who have finished their working years expect to finish their days easily and pleasantly. Instead, due to prostate ravages, they end their lives in misery. Thousands more aren't even allowed to retire—the murderous onset of this gland failure wrecks their earning power, and they end their shortened lives not only in ill health but in poverty. Millions more, if they are not actually sick, are harassed and kept about half-alive by the nagging, annoying symptoms of prostate weakness.

Yet it is often so easy to relieve these gland symptoms! Thousands of men now tell how a simple, drugless, utterly *natural* treatment has brought them almost indescribable relief. Without medicines, exercises, diets, massage or violet-ray treatments, this method, which is called Thermalaid, applies a gentle, yet quick-acting healing force all through the prostate gland area. This method has been tested by over 100,000 men.

Now the true story of prostate gland weakness—its symptoms—and what it means to men who have reached or are approaching middle age has been put into a vitally interesting book, entitled "Why Many Men Are Old at Forty."

This book is now free. If you are past 40—if you are suffering from prostate gland weakness, or are starting to have any symptoms caused by this dangerous affliction, write *now* and get your copy. It will show you how thousands of men have prevented or even overcome the serious consequences of neglected prostate disorder.

*Prostate

The prostate gland lies right at the neck of the bladder. In men over forty it is easy for this tiny gland to get swollen and inflamed. As it swells, it partially prevents the bladder from emptying itself. Nerves are deadened; poisons accumulate. If not relieved early, it may even cause gland operation of the most dangerous sort.

Mail the coupon today for your copy of "Why Many Men Are Old at 40," the volume which has shown 100,000 men over forty how to attack this painful and murderous gland failure. It presents the facts and the symptoms—clearly and intelligently, collected carefully from the observations of the world's greatest specialists on this subject. Find out from this book now—don't wait for the sick gland to tell you the details in a more unpleasant fashion. Simply mail the coupon.

W. J. KIRK, President

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Please send at once, without obligation, my copy of "Why Many Men Are Old at 40," and full information regarding the new treatment.

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